

# Montana Basin Outlook Report February 1, 1995



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# Basin Outlook Reports and Federal - State - Private Cooperative Snow Surveys

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## *How forecasts are made*

Most of the annual streamflow in the Western United States originates as snowfall that has accumulated high in the mountains during winter and early spring. As the snowpack accumulates, hydrologists estimate the runoff that will occur when it melts. Predictions are based on careful measurements of snow water equivalent at selected index points. Precipitation, temperature, soil moisture and antecedent streamflow data are combined with snowpack data to prepare runoff forecasts. Streamflow forecasts are coordinated by Natural Resources Conservation Service and National Weather Service hydrologists. This report presents a comprehensive picture of water supply conditions for areas dependent upon surface runoff. It includes selected streamflow forecasts, summarized snowpack and precipitation data, reservoir storage data, and narratives describing current conditions.

Snowpack data are obtained by using a combination of manual and automated SNOTEL measurement methods. Manual readings of snow depth and water equivalent are taken at locations called snow courses on a monthly or semi-monthly schedule during the winter. In addition, snow water equivalent, precipitation and temperature are monitored on a daily basis and transmitted via meteor burst telemetry to central data collection facilities. Both monthly and daily data are used to project snowmelt runoff.

Forecast uncertainty originates from two sources: (1) uncertainty of future hydrologic and climatic conditions, and (2) error in the forecasting procedure. To express the uncertainty in the most probable forecast, four additional forecasts are provided. The actual streamflow can be expected to exceed the most probable forecast 50% of the time. Similarly, the actual streamflow volume can be expected to exceed the 90% forecast volume 90% of the time. The same is true for the 70%, 30%, and 10% forecasts. Generally, the 90% and 70% forecasts reflect drier than normal hydrologic and climatic conditions; the 30% and 10% forecasts reflect wetter than normal conditions. As the forecast season progresses, a greater portion of the future hydrologic and climatic uncertainty will become known and the additional forecasts will move closer to the most probable forecast.

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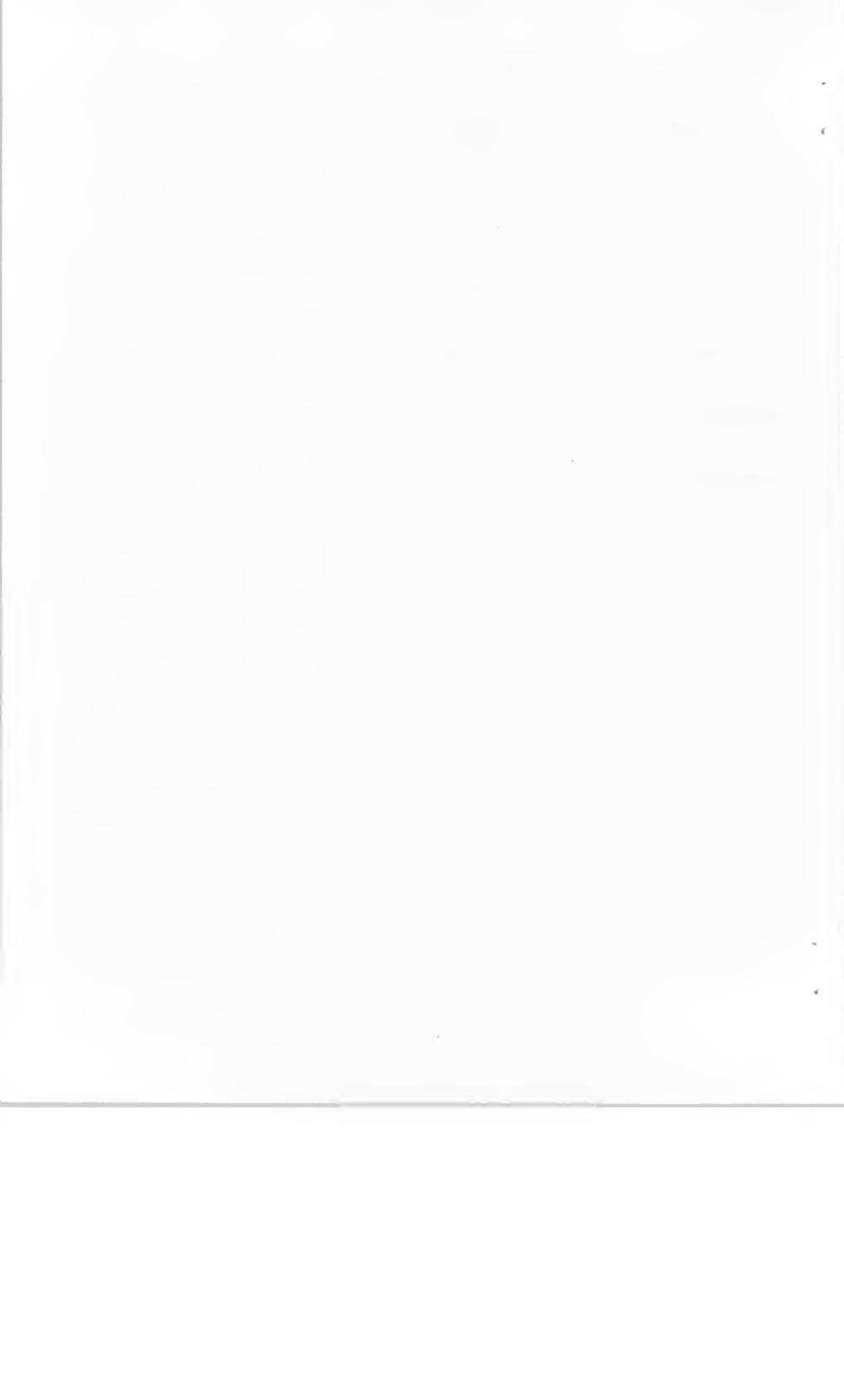
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Storms during January have been tracking mainly along the Continental Divide. Temperatures during the month have been warm with near record highs. Lower elevations during the later part of January were receiving rain, and that combined with warm temperatures caused snowpacks to begin melting in the valleys and low mountain elevations. There has not been significant melting in the mid and high elevation snowpack, but considerable settling in the snowpack has occurred with the warm temperatures.

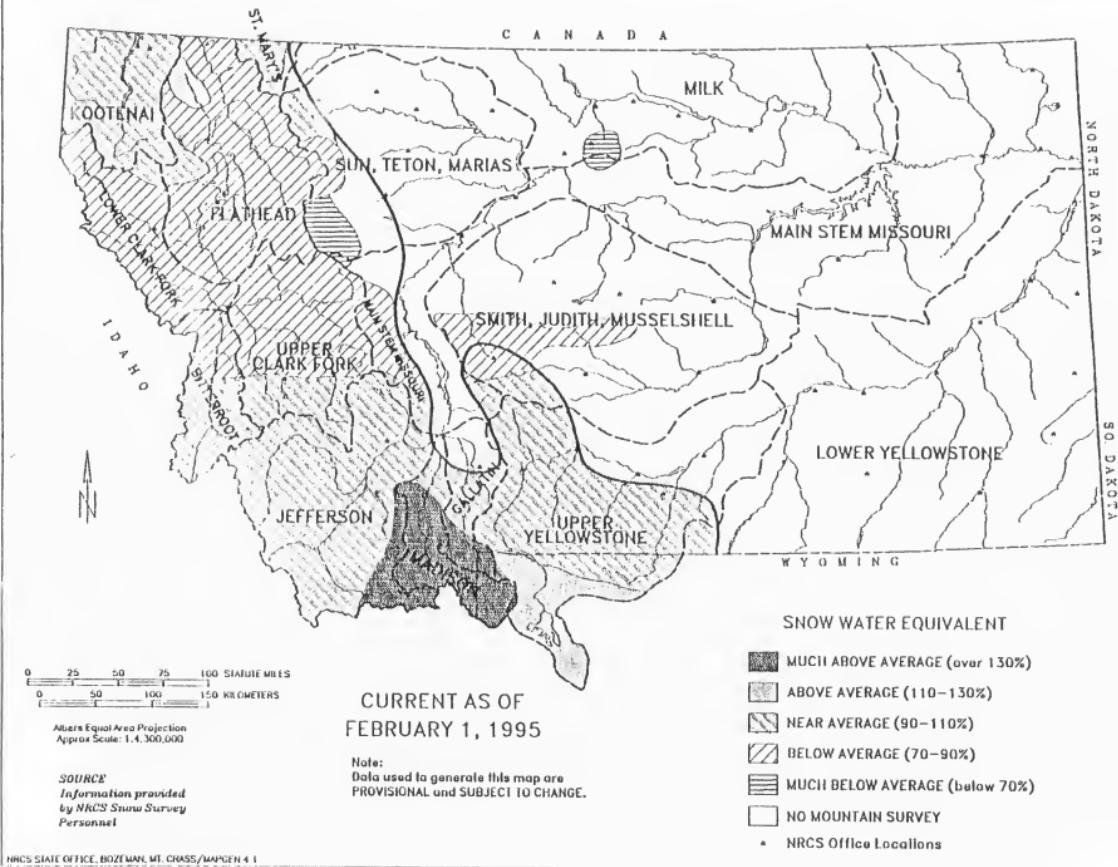
#### SNOWPACK

As of February 1, mountain snow water content across western Montana was slightly above average and about 40 percent above those of last year. River basin extremes show the Upper Madison 41 percent above average and 138 percent above last year with snow water contents being near or above record levels for this time of year. On the other extreme, the Bearpaw Mountains, near Havre, are 64 percent below average and 78 percent below last year.

West of the Continental Divide, snowpacks were 3 percent below average and 37 percent above last year. East of the Continental Divide snowpacks were 6 percent above average and 40 percent above last year.

RIVER BASIN	% OF AVERAGE	% OF LAST YEAR
COLUMBIA .....	97 .....	137
KOOTENAI .....	106 .....	159
FLATHEAD .....	99 .....	125
UPPER CLARK FORK .....	89 .....	140
BITTERROOT .....	89 .....	141
LOWER CLARK FORK .....	89 .....	145
MISSOURI .....	109 .....	148
MISSOURI HEADWATERS .....	119 .....	185
JEFFERSON .....	115 .....	189
MADISON .....	134 .....	212
GALLATIN .....	109 .....	143
MISSOURI MAINSTEM .....	87 .....	98
SMITH-JUDITH-MUSSELSHELL .....	91 .....	97
SUN-TETON-MARIAS .....	91 .....	107
MILK .....	36 .....	22
ST. MARY .....	93 .....	114
YELLOWSTONE .....	103 .....	132
UPPER YELLOWSTONE .....	105 .....	137
LOWER YELLOWSTONE (WYOMING) .....	102 .....	128
WIND .....	96 .....	161
SHOSHONE .....	115 .....	158
BIGHORN .....	104 .....	119
TONGUE .....	98 .....	98
POWDER .....	118 .....	133

## MOUNTAIN SNOWWATER EQUIVALENT FOR MONTANA



## PRECIPITATION

January precipitation across the state was 17 percent below average and 3 percent above last year, while water year precipitation was 15 percent above average and 52 percent above last year.

West of the Continental Divide, January precipitation was 24 percent below average 14 percent above last year and water year precipitation was 8 percent above average and 59 percent above last year. East of the Divide, January precipitation was 14 percent above average and 2 percent below last year and water year precipitation was 18 percent above average and 48 percent above last year.

RIVER BASIN	JANUARY % OF AVERAGE	WATER YEAR % OF AVERAGE
COLUMBIA .....	76 .....	108
KOOTENAI .....	83 .....	112
FLATHEAD .....	76 .....	112
UPPER CLARK FORK .....	69 .....	102
BITTERROOT .....	75 .....	102
LOWER CLARK FORK .....	75 .....	103
MISSOURI .....	83 .....	115
JEFFERSON .....	103 .....	124
MADISON .....	129 .....	140
GALLATIN .....	103 .....	114
MISSOURI MAINSTEM .....	55 .....	100
SMITH-JUDITH-MUSSELSHELL .....	77 .....	100
SUN-TETON-MARIAS .....	38 .....	103
MILK .....	54 .....	99
ST. MARY .....	63 .....	103
YELLOWSTONE .....	90 .....	122
UPPER YELLOWSTONE .....	89 .....	115
LOWER YELLOWSTONE .....	93 .....	130
WIND .....	78 .....	116
SHOSHONE .....	101 .....	126
BIGHORN .....	100 .....	136
TONGUE .....	111 .....	149

## RESERVOIRS

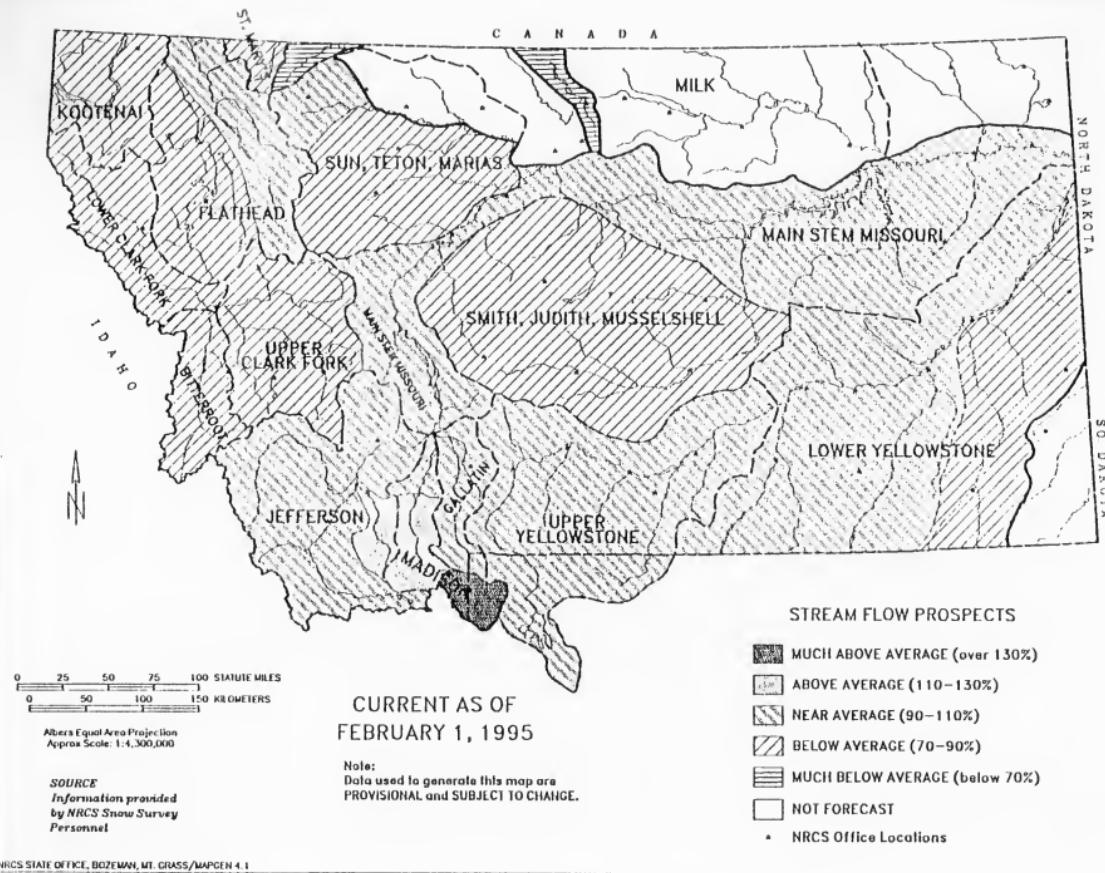
Major reservoir storage statewide was 24 percent below average and 39 percent below last year.

Reservoir storage west of the Continental Divide was 6 percent below average and 22 percent above last year. East of the Divide, reservoir storage was 3 percent below average and 10 percent below last year.

RIVER BASIN	% OF AVERAGE	% OF LAST YEAR
COLUMBIA .....	94 .....	122
KOOTENAI .....	121 .....	118
FLATHEAD .....	75 .....	130
UPPER CLARK FORK .....	104 .....	90
BITTERROOT .....	50 .....	141
LOWER CLARK FORK .....	104 .....	102
MISSOURI .....	98 .....	90
JEFFERSON .....	74 .....	63
MADISON .....	104 .....	101
GALLATIN .....	147 .....	136
MISSOURI MAINSTEM .....	95 .....	94
SMITH-JUDITH-MUSSELSHELL .....	102 .....	74
SUN-TETON-MARIAS .....	110 .....	86
MILK .....	99 .....	63
ST. MARY .....	65 .....	47
YELLOWSTONE .....	94 .....	97
UPPER YELLOWSTONE .....	108 .....	108
LOWER YELLOWSTONE .....	94 .....	97

# STREAM FLOW PROSPECTS FOR MONTANA

Spring and Summer Period



## STREAMFLOW

Streamflow forecasts across Montana were 8 percent below average and 32 percent above last years forecasts.

West of the Continental Divide, streamflows were forecast to be 14 percent below average and 24 percent above last years forecasts. East of the Divide, streamflows were forecast to be 2 percent above average and 43 percent above last years forecasts.

RIVER BASIN	FORECASTS % OF AVERAGE	FORECASTS % OF LAST YEAR
COLUMBIA .....	86 .....	124
KOOTENAI .....	92 .....	120
FLATHEAD .....	91 .....	122
UPPER CLARK FORK .....	78 .....	128
BITTERROOT .....	79 .....	136
LOWER CLARK FORK .....	81 .....	127
MISSOURI .....	105 .....	84
JEFFERSON .....	105 .....	197
MADISON .....	124 .....	159
GALLATIN .....	103 .....	139
MAINSTEM MISSOURI .....	106 .....	161
SMITH-JUDITH-MUSSELHELL .....	87 .....	99
SUN-TETON-MARIAS .....	85 .....	113
MILK .....	68 .....	101
ST. MARY .....	84 .....	109
YELLOWSTONE .....	100 .....	147
UPPER YELLOWSTONE .....	102 .....	133
LOWER YELLOWSTONE .....	99 .....	130

NOTE: The FORECAST AS % OF LAST YEAR column above, is this years forecast as a percent of last years forecast, not of what actually occurred.

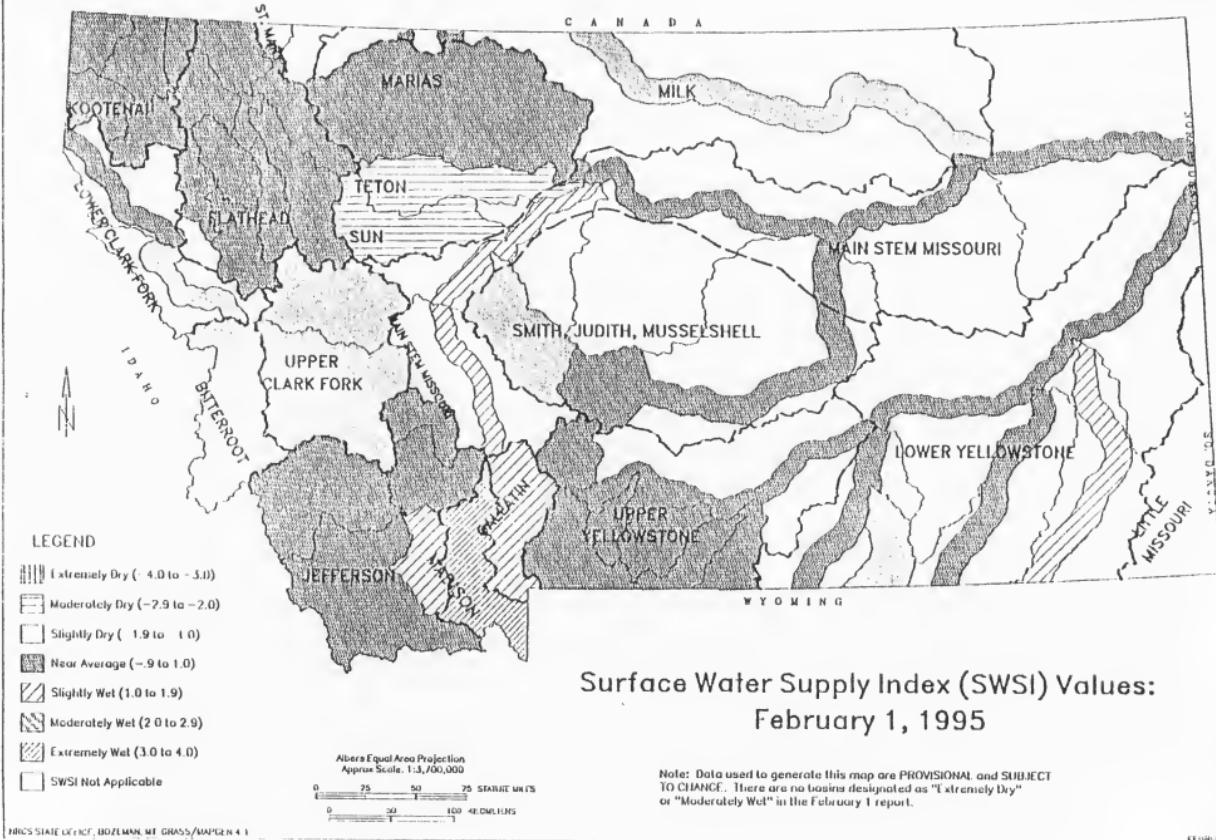
## SURFACE WATER SUPPLY INDEX

The Surface Water Supply Index (SWSI) is a measure of surface water availability for the spring and summer months. Water users that rely on mountain precipitation can use the index to evaluate seasonal surface water supplies. The SWSI accounts for mountain snowpack, mountain precipitation, streamflow, reservoir storage, and soil moisture.

SWSI RATING	SURFACE WATER CONDITION
+3.0 to +4.0	Extremely Wet
+2.0 to +3.0	Moderately Wet
+1.0 to +2.0	Slightly Wet
-1.0 to +1.0	Near Average
-1.0 to -2.0	Slightly Dry
-2.0 to -3.0	Moderately Dry
-3.0 to -4.0	Extremely Dry

SWSI's on February 1, were ranging from -1.9 to +3.1 statewide. West of the divide, SWSI's were ranging from -1.4 to +0.6 and east of the divide from -2.3 to +3.1

SWSI	Basin
-0.8	Kootenai River at Ft. Steele (Kootenai in Canada)
0.5	Tobacco River
0.4	Kootenai Ft. Steele to Libby Dam
0.6	Kootenai River below Libby Dam
0.0	Fisher River
-0.4	Yaak River
0.0	North Fork Flathead River
0.0	Middle FORK Flathead River
-0.6	South Fork Flathead River
-0.2	Flathead River at Columbia Falls
0.3	Stillwater/Whitefish Rivers
-0.2	Swan River
-0.3	Flathead River at Polson
-0.7	Mission Valley
-0.9	Little Bitterroot River
-1.1	Clark Fork River above Rock Creek
-1.4	Blackfoot River
-1.3	Clark Fork River above Missoula
-1.0	Bitterroot River
-1.2	Clark Fork River below Bitterroot River
-0.6	Clark Fork River below Flathead River
-0.6	Beaverhead River
1.8	Ruby River
0.6	Big Hole River
0.5	Boulder River (Jefferson)
0.5	Jefferson River
3.1	Madison River
1.3	Gallatin River
1.6	Missouri River above Canyon Ferry
1.1	Missouri River below Canyon Ferry
-1.0	Smith River
-2.3	Sun River
-2.2	Teton River
-1.6	Birch/Dupuyer Creeks
-0.2	Marias River
-0.5	Musselshell River
0.6	Missouri River above Ft. Peck
0.1	Missouri River below Ft. Peck
-1.9	Milk River
0.4	Yellowstone River above Livingston
0.6	Shields River
0.5	Boulder River (Yellowstone)
0.4	Stillwater River
0.2	Rock/Red Lodge Creeks
-0.2	Clarks Fork River
0.3	Yellowstone River above Bighorn River
-0.4	Bighorn River below Bighorn Lake
-1.4	Little Bighorn River
0.5	Yellowstone River below Bighorn River
-0.4	Tongue River
1.9	Powder River



Surface Water Supply Index (SWSI) Values:  
February 1, 1995

Note: Data used to generate this map are PROVISIONAL, and SUBJECT TO CHANGE. There are no basins designated as "Extremely Dry" or "Moderately Wet" in the February 1 report.

## KOOTENAI RIVER BASIN in Montana as of February 1, 1995

Snowpack conditions in the Kootenai River Basin in Montana and Canada were near average. Snow water content for the Kootenai in Montana was 6 percent above average and 59 percent above last year. Snow water content for the Kootenai in Canada was 5 percent below average and 9 percent above last year.

## Watershed Snowpack Analysis

Watershed	Number of Data Sites	This Year as Percent of Last Year	This Year as Percent of Average
KOOTENAI MAINSTEM	2	201	115
TOBACCO	3	136	107
FISHER	1	140	93
YAAK	5	159	102
KOOTENAI ab BONNERS FERRY	29	128	101
KOOTENAI in MONTANA	11	160	107

Mountain precipitation during January was 16 percent below average and 45 percent above last year. Valley precipitation during January was 22 percent below average and 238 percent above last year. Water year precipitation for the basin, beginning October 1, 1994, was 12 percent above average and 81 percent above last year.

Lake Koocanusa storage on the last day of January was 21 percent above average and 18 percent above last year.

## Reservoir Storage (1000AF) End of January

Reservoir	Usable Capacity	***** This Year	Usable Storage Last Year	***** Average
LAKE KOOCANUSA	5748.0	2881.0	2443.0	2381.0

Streamflows, for the period April through July, are forecast to be 8 percent below average and 20 percent above last years forecasts.

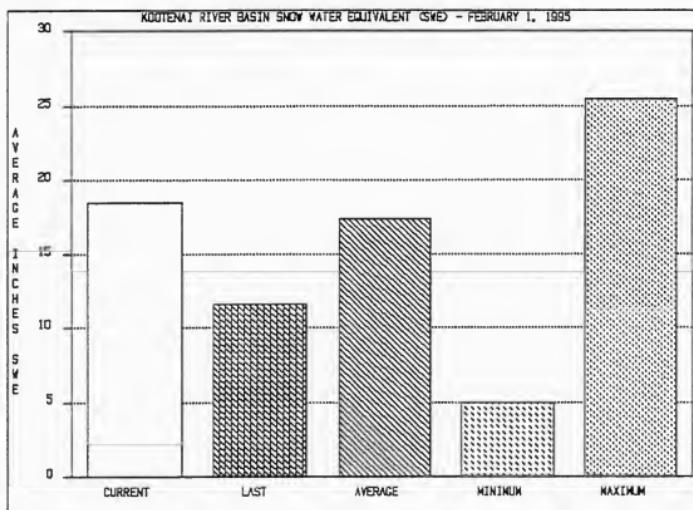
Streamflow Forecasts								
Forecast Pt Forecast Period	<--- Drier --- Future Conditions --- Wetter --->						30 Yr Avg (1000AF)	
	Chance of Exceeding *							
	90% (1000AF)	70% (1000AF)	50% (Most Prob) (1000AF)	30% (% AVG.) (1000AF)	10% (1000AF)			
TOBACCO nr Eureka								
APR-JUL	83	98	109	82	120	135	133	
APR-SEP	90	108	120	82	132	150	147	
KOOTENAI bl Libby Dam (1,2)								
APR-JUL	3990	4880	5290	92	5700	6600	5779	
APR-SEP	4670	5720	6200	92	6680	7730	6772	
FISHER nr Libby								
APR-JUL	116	152	176	75	200	235	234	
APR-SEP	140	174	197	79	220	255	250	
YAAK near Troy								
APR-JUL	330	380	410	85	440	490	483	
APR-SEP	350	395	430	85	465	510	505	
KOOTENAI at Leonia (1,2)								
APR-JUL	5080	6210	6730	93	7250	8380	7199	
APR-SEP	5840	7150	7740	94	8330	9640	8275	

\* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
- (2) - The value is natural flow - actual flow may be affected by upstream water management.

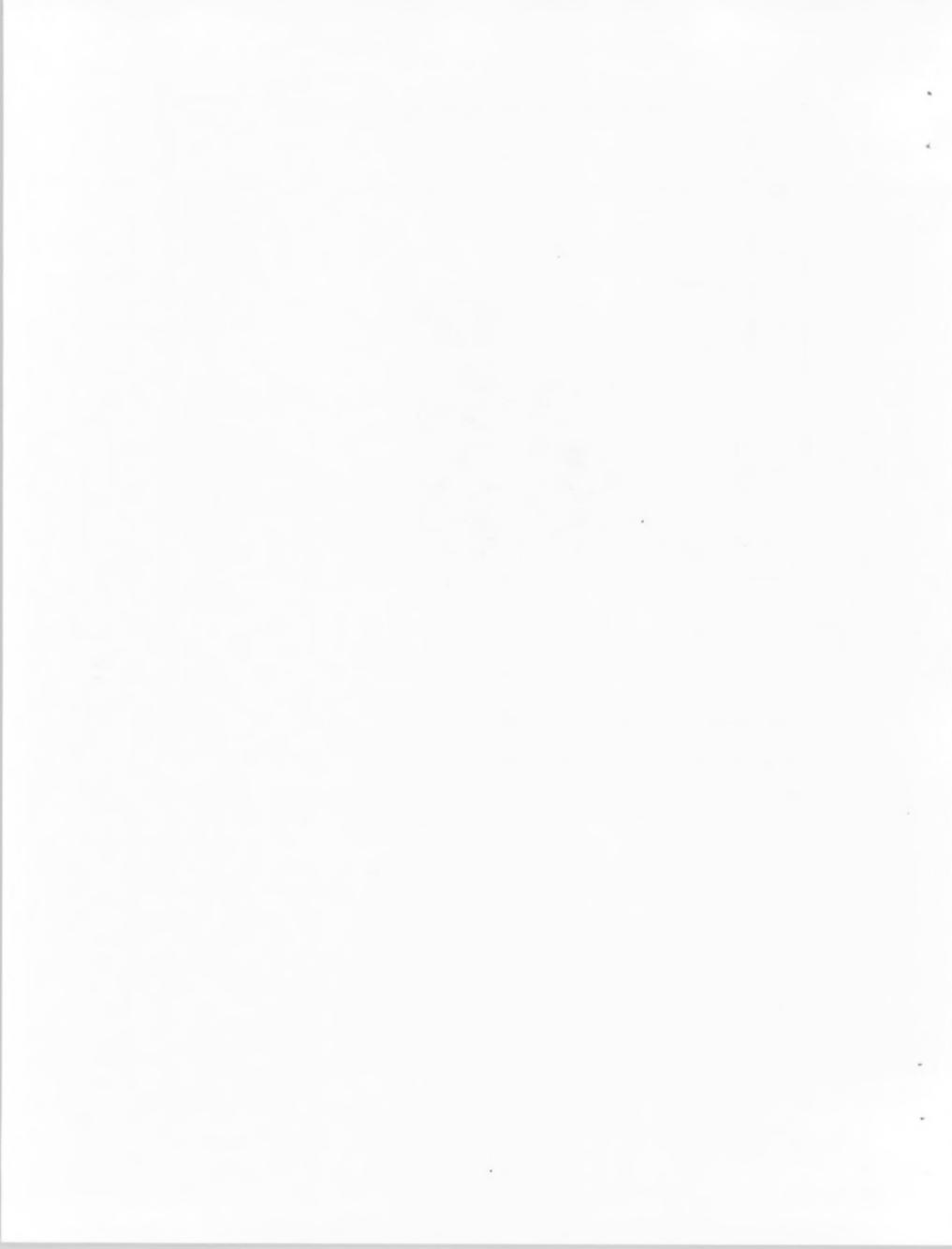
Surface Water Supply Indexes (SWSI's) were -0.8 in the Kootenai at Ft. Steele (Kootenai in Canada); 0.5 in the Tobacco River; 0.4 in the Kootenai Ft. Steele to Libby Dam; 0.6 in the Kootenai River below Libby Dam; 0.0 in the Fisher River; and -0.4 in the Yaak River.



AVERAGE IS FOR THE PERIOD 1961-1990.

MINIMUM SNOW WATER EQUIVALENT, 1969-1993, OCCURRED IN WATER YEAR 1977.

MAXIMUM SNOW WATER EQUIVALENT, 1969-1993, OCCURRED IN WATER YEAR 1972.



## FLATHEAD RIVER BASIN as of February 1, 1995

Snowpack conditions in the Flathead River Basin of Montana and Canada were slightly below average. Snow water content in the North Fork Flathead in Canada was 8 percent below average and 30 percent above last year. Snow water content in the Flathead in Montana was 1 percent below average and 25 percent above last year.

## Watershed Snowpack Analysis

Watershed	Number of Data Sites	This Year as Percent of Last Year	This Year as Percent of Average
NORTH FORK in CANADA	3	136	97
NORTH FORK in MONTANA	7	129	106
MIDDLE FORK	6	118	95
SOUTH FORK	6	114	98
STILLWATER-WHITEFISH	7	133	110
SWAN	6	124	100
MISSION VALLEY	3	154	113
LITTLE BITTERROOT-ASHLEY	4	99	85
JOCKO	5	125	83
FLATHEAD in MONTANA	32	124	99
FLATHEAD RIVER BASIN	35	125	98

Mountain precipitation during January was 24 percent below average and 4 percent below last year. Valley precipitation during January was 32 percent below average and 26 percent above last year. Water year precipitation for the basin, beginning October 1, 1994, was 12 percent above average and 52 percent above last year.

Reservoir storage on the last day of January was 25 percent below average and 30 percent above last year. Combined Camas reservoir storage was 51 percent below average and 49 percent below last year; combined Mission Valley reservoir storage was 27 percent below average and 30 percent below last year; Hungry Horse storage was 31 percent below average and 44 percent above last year; and Flathead Lake storage was 12 percent below average and 16 percent above last year.

## Reservoir Storage (1000AF) End of January

Reservoir	Usable Capacity	***** This Year	Usable Storage Last Year	***** Average
CAMAS (4)	45.2	9.6	18.7	19.4
MISSION VALLEY (8)	100.0	26.5	37.8	36.2
HUNGRY HORSE	3451.0	1635.0	1136.0	2362.0
FLATHEAD LAKE	1791.0	962.9	826.9	1095.0

Streamflows, for the period April through July, are forecast to be 9 percent below average and 22 percent above last years forecasts.

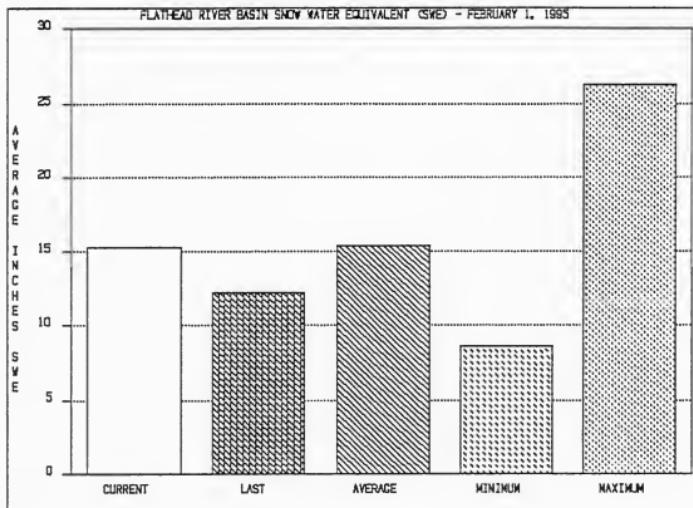
Streamflow Forecasts								
Forecast Pt Forecast Period	<-- Drier -- Future Conditions -- Wetter -->							
	Chance of Exceeding *		30 Yr Avg					
	90% (1000AF)	70% (1000AF)	50% (Most Prob) (1000AF)	30% (% AVG.) (1000AF)	10% (1000AF)			
NF FLATHEAD nr Columbia Falls								
APR-JUL	1320	1430	1510	91	1590	1710	1662	
APR-SEP	1460	1590	1670	91	1750	1880	1836	
MF FLATHEAD nr West Glacier								
APR-JUL	1280	1440	1550	95	1660	1820	1638	
APR-SEP	1410	1580	1700	95	1820	1990	1788	
SF FLATHEAD nr Columbia Fls (1,2)								
APR-JUL	1470	1770	1910	93	2050	2350	2051	
APR-SEP	1570	1890	2030	93	2170	2490	2184	
FLATHEAD at Columbia Falls (2)								
APR-JUL	4220	4680	5000	91	5320	5780	5482	
APR-SEP	4590	5090	5430	91	5770	6270	5960	
STILLWATER nr Whitefish								
APR-JUL	120	141	155	82	169	191	189	
APR-SEP	136	158	173	83	188	210	209	
WHITEFISH nr Kalispell								
APR-JUL	64	76	84	81	92	104	104	
APR-SEP	75	87	95	82	103	115	116	
SWAN nr Bigfork								
APR-JUL	390	445	482	83	520	575	583	
APR-SEP	445	505	549	83	590	655	665	
FLATHEAD nr Polson (1,2)								
APR-JUL	4500	5350	5730	90	6110	6960	6390	
APR-SEP	4880	5790	6210	90	6630	7540	6926	

\* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
- (2) - The value is natural flow - actual flow may be affected by upstream water management.

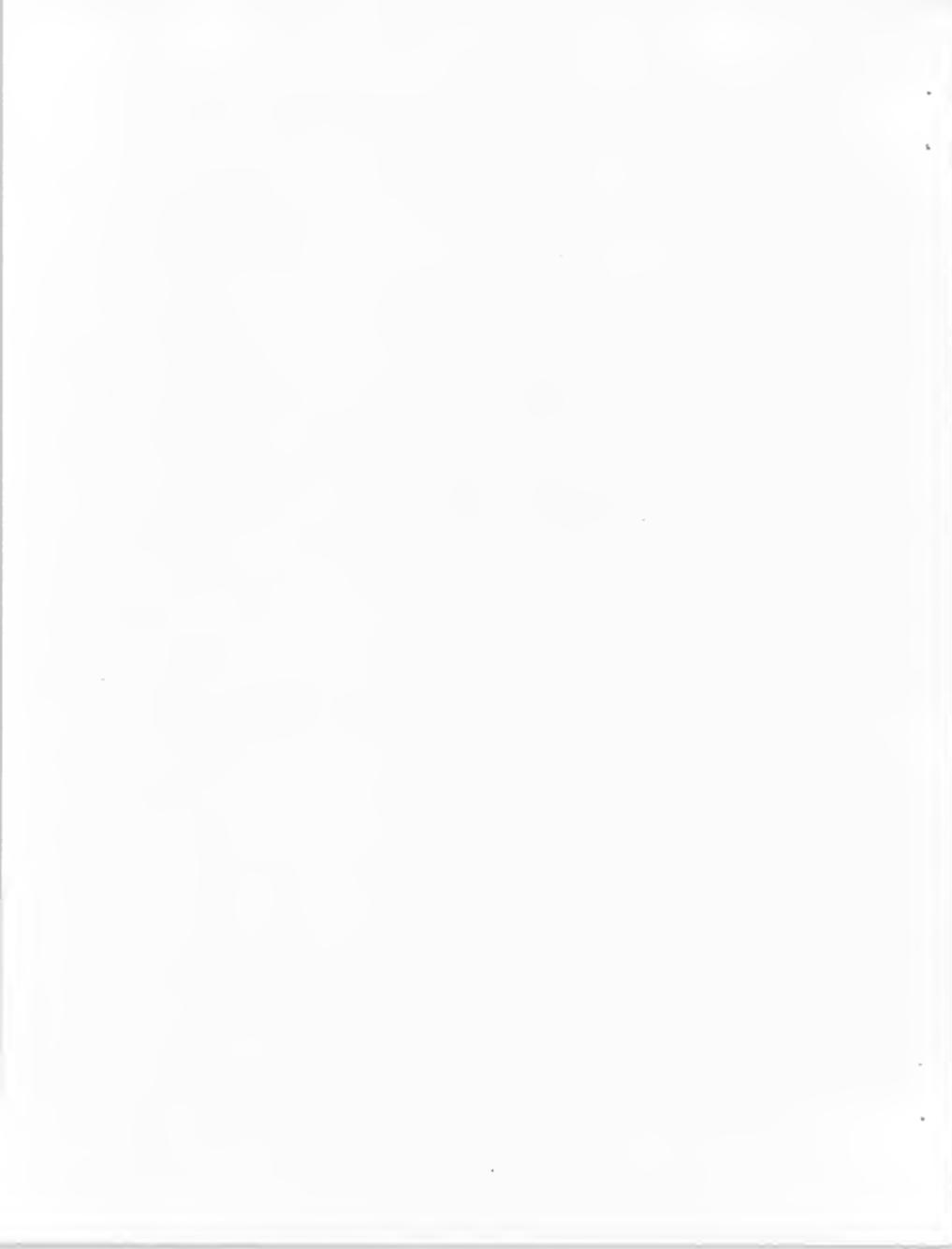
Surface Water Supply Indexes (SWSI's) were 0.0 in the North Fork Flathead River; 0.0 in the Middle Fork Flathead River; -0.6 in the South Fork Flathead River; -0.2 in the Flathead River at Columbia Falls; 0.3 in the Stillwater/Whitefish Rivers; -0.2 in the Swan River; -0.3 in the Flathead River at Polson; -0.7 in the Mission Valley; and -0.9 in the Little Bitterroot River.



AVERAGE IS FOR THE PERIOD 1961-1990.

MINIMUM SNOW WATER EQUIVALENT, 1961-1993, OCCURRED IN WATER YEAR 1977.

MAXIMUM SNOW WATER EQUIVALENT, 1961-1993, OCCURRED IN WATER YEAR 1972.



## UPPER CLARK FORK RIVER BASIN as of February 1, 1995

Snowpack conditions in the Upper Clark Fork River Basin were below average. Snow water content was 11 percent below average and 40 percent above last year.

## Watershed Snowpack Analysis

Watershed	Number of Data Sites	This Year as Percent of Last Year	This Year as Percent of Average
CLARK FORK ab FLINT CREEK	9	142	97
FLINT CREEK	6	150	94
ROCK CREEK	3	193	100
CLARK FORK ab BLACKFOOT	15	149	96
BLACKFOOT	14	129	82
UPPER CLARK FORK BASIN	27	140	89

Mountain precipitation during January was 28 percent below average and 9 percent above last year. Valley precipitation during January was 49 percent below average and the same as last year. Water year precipitation for the basin, beginning October 1, 1994, was 2 percent above average and 49 percent above last year.

Reservoir storage on the last day of January was 4 percent above average and 10 percent below last year. Georgetown Lake storage was 4 percent above average and the same as last year; Lower Willow Creek storage was 7 percent below average and 59 percent below last year; and Nevada Creek storage was 7 percent above average and 28 percent below last year.

## Reservoir Storage (1000AF) End of January

Reservoir	Usable Capacity	***** Usable Storage This Year	***** Last Year	***** Average
GEORGETOWN LAKE	31.0	28.1	28.0	27.0
LOWER WILLOW CREEK	4.9	1.4	3.4	1.5
NEVADA CREEK	12.6	4.6	6.4	4.3

Streamflows, for the period April through July, are forecast to be 22 percent below average and 28 percent above last years forecasts.

## Streamflow Forecasts

Forecast Pt Forecast Period	<--- Drier --- Future Conditions --- Wetter --->					30 Yr Avg (1000AF)	
	Chance of Exceeding *						
	90% (1000AF)	70% (1000AF)	50% (Most Prob) (1000AF)	30% (1000AF)	10% (1000AF)		
MOULTON RES inflow (million gal.)							
APR-JUN	101	155	191	90	225	280	212
APR-JUL	109	169	210	90	250	310	234
WARM SPRINGS CK at Anaconda (2)							
APR-JUL	22	29	34	89	39	46	38
APR-SEP	30	38	43	91	49	57	47

## Streamflow Forecasts

Forecast Pt Forecast Period	<--- Drier --- Future Conditions --- Wetter --->						30 Yr Avg (1000AF)	
	Chance of Exceeding *							
	90% (1000AF)	70% (1000AF)	50% (Most Prob) (1000AF)	30% (% AVG.) (1000AF)	10% (1000AF)			
<b>LITTLE BLACKFOOT nr Garrison</b>								
APR-JUL	5.0	36	58	70	80	111	83	
APR-SEP	7.0	41	64	72	87	121	89	
<b>FLINT CK nr Southern Cross (2)</b>								
APR-JUL	4.8	8.3	10.6	75	12.9	16.4	14.2	
APR-SEP	5.0	9.3	12.2	73	15.1	19.4	16.7	
<b>FLINT CK bl Boulder Ck</b>								
APR-JUL	23	36	45	79	54	67	57	
APR-SEP	30	46	57	78	68	84	73	
<b>LOWER WILLOW CK RES inflow</b>								
APR-JUL	2.5	5.0	7.7	55	10.4	14.3	14.0	
APR-SEP	2.8	5.6	8.4	57	11.2	15.2	14.8	
<b>MF ROCK CK nr Philipsburg</b>								
APR-JUL	37	46	53	80	60	69	66	
APR-SEP	42	53	60	81	67	78	74	
<b>ROCK CK nr Clinton</b>								
APR-JUL	150	190	218	74	245	285	296	
APR-SEP	176	220	250	75	280	325	333	
<b>NEVADA CK nr Finn</b>								
APR-JUL	4.5	10.2	14.0	73	17.8	24	19.1	
APR-SEP	5.0	11.0	15.0	72	19.0	25	21	
<b>CLEARWATER nr Clearwater</b>								
APR-JUL	118	134	145	84	156	172	172	
APR-SEP	125	142	153	85	164	181	181	
<b>BLACKFOOT nr Bonner</b>								
APR-JUL	410	510	580	69	650	750	835	
APR-SEP	465	575	650	70	725	835	926	

Streamflow Forecasts

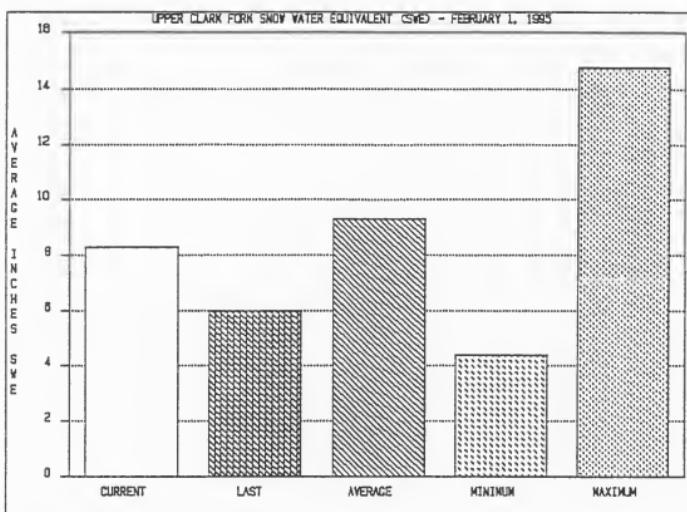
Forecast Pt Forecast Period	<-- Drier -- Future Conditions -- Wetter -->					30 Yr Avg (1000AF)	
	Chance of Exceeding *		50% (Most Prob)	30%	10%		
	90% (1000AF)	70% (1000AF)	(1000AF)	(% AVG.)	(1000AF)	(1000AF)	
<b>CLARK FORK ab Milltown</b>							
APR-JUL	305	455	559	86	660	815	652
APR-SEP	370	535	650	86	765	930	755
<b>CLARK FORK ab Missoula</b>							
APR-JUL	770	995	1150	77	1300	1530	1487
APR-SEP	875	1120	1290	77	1460	1710	1681

\* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
- (2) - The value is natural flow - actual flow may be affected by upstream water management.

Surface Water Supply Indexes (SWSI's) were -1.1 in the Clark Fork River above Rock Creek; -1.4 in the Blackfoot River; and -1.3 in the Clark Fork River above Missoula.



AVERAGE IS FOR THE PERIOD 1961-1990.

MINIMUM SNOW WATER EQUIVALENT, 1961-1993, OCCURRED IN WATER YEAR 1977.

MAXIMUM SNOW WATER EQUIVALENT, 1961-1993, OCCURRED IN WATER YEAR 1972.

BITTERROOT RIVER BASIN as of February 1, 1995

Snowpack conditions in the Bitterroot River Basin were below average. Snow water content was 11 percent below average and 41 percent above last year.

Watershed Snowpack Analysis

Watershed	Number of Data Sites	This Year as Percent of Last Year	This Year as Percent of Average
WEST FORK BITTERROOT	2	149	94
EAST SIDE BITTERROOT	3	160	92
WEST SIDE BITTERROOT	3	135	89
BITTERROOT RIVER BASIN	7	141	89

Mountain precipitation during January was 27 percent below average and 8 percent above last year. Valley precipitation during January was 3 percent below average and 210 percent above last year. Water year precipitation for the basin, beginning October 1, 1994, was 2 percent above average and 56 percent above last year.

Reservoir storage on the last day of January was 50 percent below average and 41 percent above last year. Painted Rocks Lake storage was 87 percent below average and 27 percent below last year and Como storage was 6 percent below average and 65 percent above last year.

Reservoir Storage (1000AF) End of January

Reservoir	Usable Capacity	***** Usable Storage This Year	***** Last Year	***** Average
PAINTED ROCKS LAKE	31.7	1.6	2.2	12.7
COMO	34.9	10.4	6.3	11.1

Streamflows, for the period April through July, are forecast to be 22 percent below average and 28 percent above last years forecasts.

Streamflow Forecasts

Forecast Pt Forecast Period	<-- Drier -- Future Conditions -- Wetter -->						30 Yr Avg (1000AF)	
	Chance of Exceeding *							
	90% (1000AF)	70% (1000AF)	50% (Most Prob) (1000AF)	30% (1000AF)	10% (1000AF)			
WF BITTERROOT nr Conner (2)								
APR-JUL	65	90	107	70	124	149	152	
APR-SEP	73	99	117	70	135	161	166	
BITTERROOT nr Darby								
APR-JUL	280	350	400	81	450	520	491	
APR-SEP	320	390	440	81	490	560	540	
ROCK CK nr Darby (2)								
APR-JUL	50	59	64	81	70	78	79	
APR-SEP	54	62	68	82	74	82	83	

**Streamflow Forecasts**

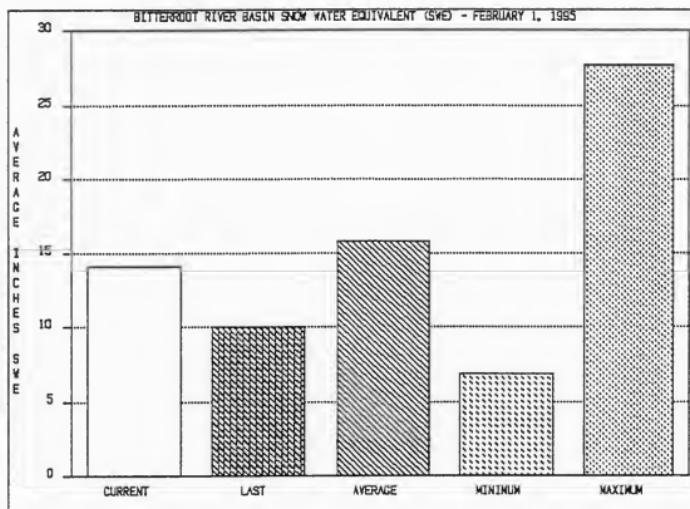
Forecast Pt Forecast Period	<-- Drier -- Future Conditions -- Wetter -->						30 Yr Avg (1000AF)	
	Chance of Exceeding *							
	90% (1000AF)	70% (1000AF)	50% (Most Prob) (1000AF)	(% AVG.) (1000AF)	30% (1000AF)	10% (1000AF)		
<b>SKALKAHO CK nr Hamilton</b>								
APR-JUL	22	28	32	70	36	42	46	
APR-SEP	27	33	38	72	43	49	53	
<b>BURNT FORK CK nr Stevensville (2)</b>								
APR-JUL	13.0	18.0	21	72	24	29	29	
APR-SEP	16.0	21	25	74	29	34	34	
<b>BITTERROOT at Missoula</b>								
APR-JUL	770	925	1030	79	1140	1290	1301	
APR-SEP	855	1020	1130	80	1240	1400	1418	

\* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
- (2) - The value is natural flow - actual flow may be affected by upstream water management.

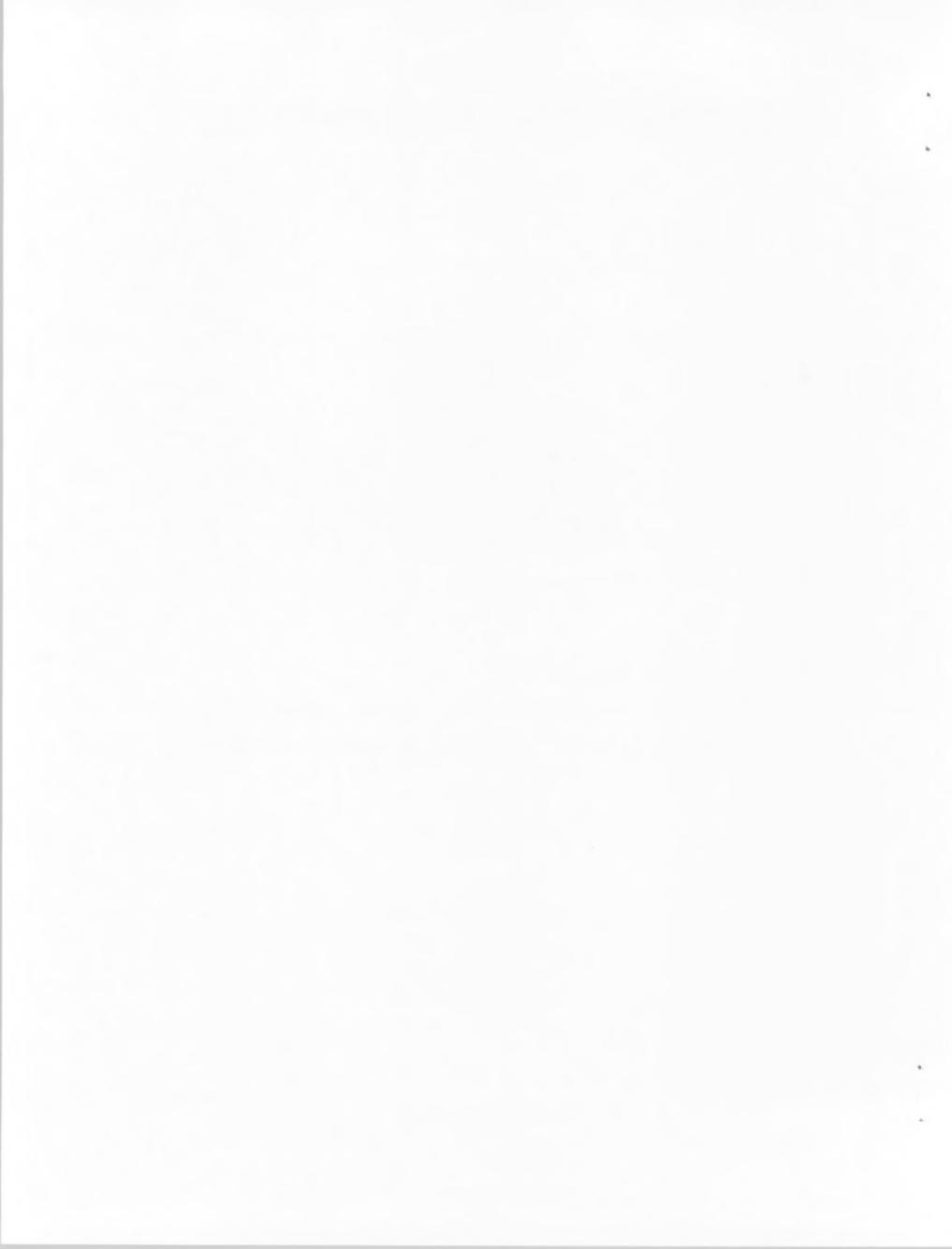
Surface Water Supply Index (SWSI) was -1.0 in the Bitterroot River.



AVERAGE IS FOR THE PERIOD 1961-1990.

MINIMUM SNOW WATER EQUIVALENT, 1961-1993, OCCURRED IN WATER YEAR 1977.

MAXIMUM SNOW WATER EQUIVALENT, 1961-1993, OCCURRED IN WATER YEAR 1972.



Snowpack conditions in the Lower Clark Fork River Basin are below average. Snow water content was 11 percent below average and 45 percent above last year.

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#### Watershed Snowpack Analysis

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Watershed	Number of Data Sites	This Year as Percent of Last Year	This Year as Percent of Average
LOWER CLARK FORK	8	148	87

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Mountain precipitation during January was 23 percent below average and 20 percent above last year. Valley precipitation during January was 26 percent below average and 99 percent above last year. Water year precipitation for the basin, beginning October 1, 1994, was 3 percent above average and 62 percent above last year.

Noxon Rapids storage on the last day of January was 4 percent above average and 2 percent above last year.

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#### Reservoir Storage (1000AF) End of January

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Reservoir	Usable Capacity	***** Usable Storage This Year	***** Usable Storage Last Year	***** Usable Storage Average
NOXON RAPIDS	335.0	326.5	320.6	314.2

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Streamflows, for the period April through July, are forecast to be 19 percent below average and 27 percent above last years forecasts.

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#### Streamflow Forecasts

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Forecast Pt Forecast Period	<--- Drier --- Future Conditions --- Wetter --->						30 Yr Avg (1000AF)	
	Chance of Exceeding *							
	90% (1000AF)	70% (1000AF)	50% (Most Prob) (1000AF)	30% (% AVG.)	10% (1000AF)			
<b>CLARK FORK ab Missoula</b>								
APR-JUL	770	995	1150	77	1300	1530	1487	
APR-SEP	875	1120	1290	77	1460	1710	1681	
<b>CLARK FORK bl Missoula</b>								
APR-JUL	1590	1940	2180	78	2420	2770	2788	
APR-SEP	1780	2160	2420	78	2680	3060	3099	
<b>CLARK FORK at St. Regis (1)</b>								
APR-JUL	1380	2400	2860	78	3320	4340	3686	
APR-SEP	1530	2660	3180	78	3700	4830	4095	
<b>CLARK FORK nr Plains (1,2)</b>								
APR-JUL	5720	7780	8720	83	9660	11700	10450	
APR-SEP	6280	8550	9580	84	10600	12900	11470	

Streamflow Forecasts

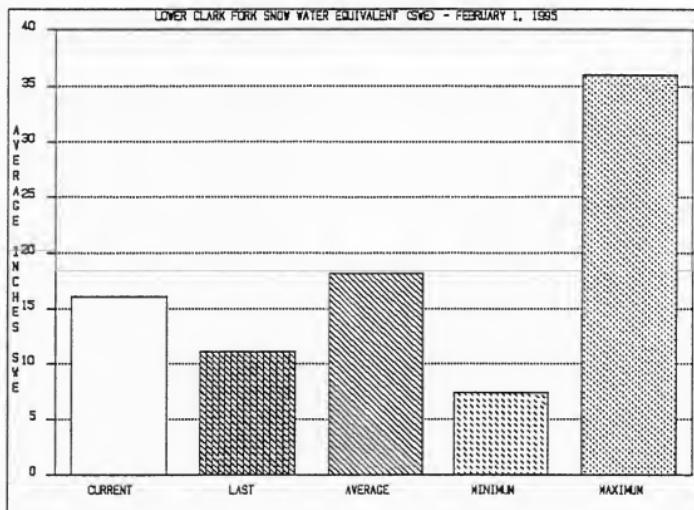
Forecast Pt Forecast Period	<--- Drier --- Future Conditions --- Wetter --->					30 Yr Avg (1000AF)	
	Chance of Exceeding *						
	90% (1000AF)	70% (1000AF)	50% (Most Prob) (1000AF)	30% (1000AF)	10% (1000AF)		
THOMPSON RIVER nr Thompson Falls							
APR-JUL	89	122	144	67	166	199	214
APR-SEP	106	141	165	69	189	225	240
PROSPECT CREEK at Thompson Falls							
APR-JUL	72	88	99	80	110	126	123
APR-SEP	79	96	107	81	118	135	132
CLARK FK at Whitehorse Rpd (1,2)							
APR-JUL	6010	8380	9450	81	10500	12900	11730
APR-SEP	6620	9220	10400	81	11600	14200	12910

\* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
- (2) - The value is natural flow - actual flow may be affected by upstream water management.

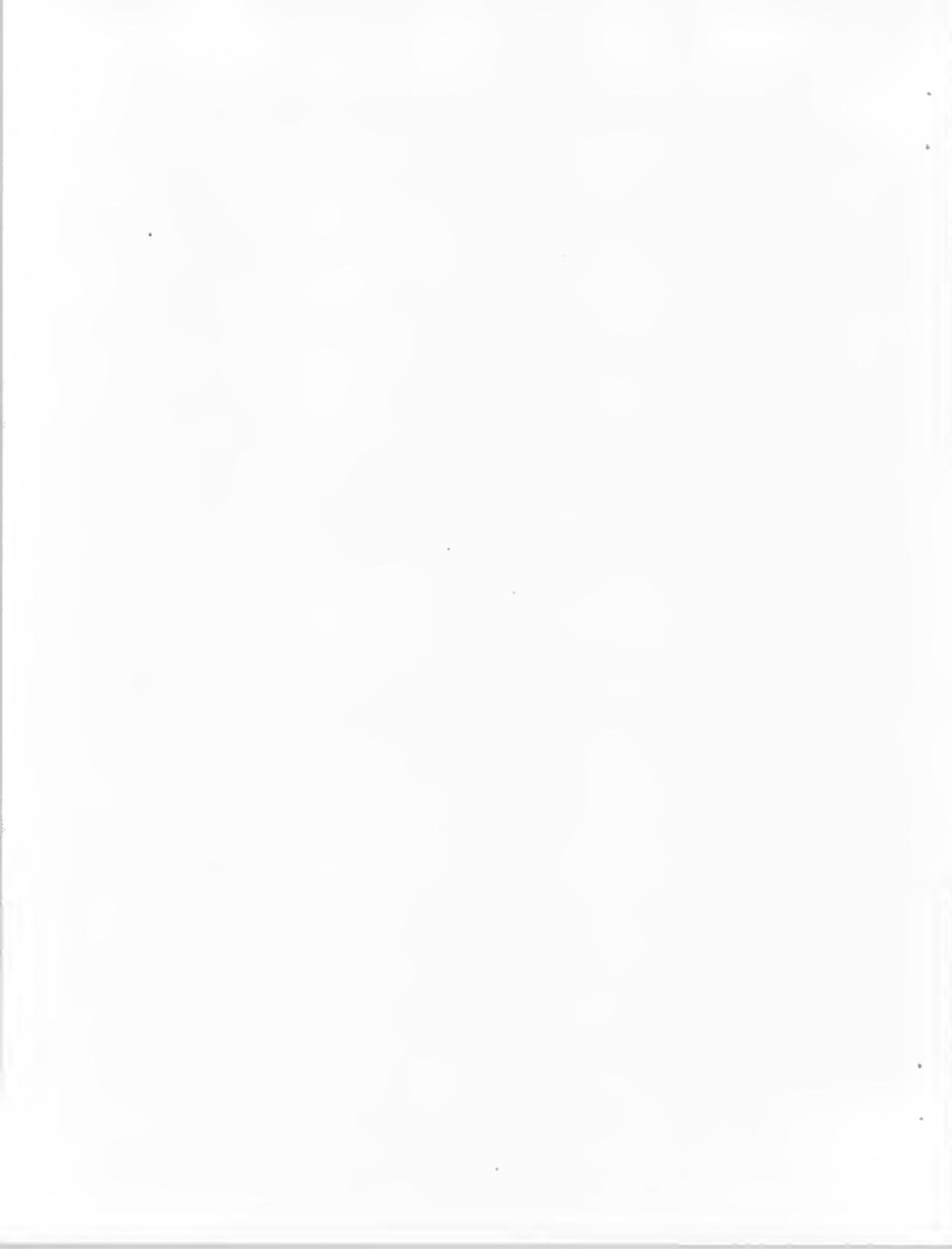
Surface Water Supply Indexes (SWSI's) were -1.2 in the Clark Fork River below Bitterroot River and -0.6 in the Clark Fork River below Flathead River.



AVERAGE IS FOR THE PERIOD 1961-1990.

MINIMUM SNOW WATER EQUIVALENT, 1961-1993, OCCURRED IN WATER YEAR 1977.

MAXIMUM SNOW WATER EQUIVALENT, 1961-1993, OCCURRED IN WATER YEAR 1972.



## JEFFERSON RIVER BASIN as of February 1, 1995

Snowpack conditions in the Jefferson River Basin were above average. Snow water content was 15 percent above average and 89 percent above last year.

## Watershed Snowpack Analysis

Watershed	Number of Data Sites	This Year as Percent of Last Year	This Year as Percent of Average
BEAVERHEAD	8	204	122
RUBY	4	186	124
BIGHOLE	9	172	105
BOULDER	7	182	112
JEFFERSON RIVER BASIN	23	189	115

Mountain precipitation during January was 1 percent above average and 43 percent above last year. Valley precipitation during January was 51 percent above average and 241 percent above last year. Water year precipitation for the basin, beginning October 1, 1994, was 24 percent above average and 88 percent above last year.

Reservoir storage on the last day of January was 26 percent below average and 37 percent below last year. Lima storage was 63 percent below average; Clark Canyon storage was 19 percent below average and 24 percent below last year; and Ruby River storage was 20 percent below average and 38 percent below last year.

## Reservoir Storage (1000AF) End of January

Reservoir	Usable Capacity	***** This Year	Usable Storage Last Year	***** Average
LIMA	84.0	12.2	50.8	33.4
CLARK CANYON	255.6	117.5	154.4	144.7
RUBY RIVER	38.8	19.0	30.6	23.8

Streamflows, for the period April through July, are forecast to be 5 percent above average and 97 percent above last years forecasts.

JEFFERSON RIVER BASIN  
Streamflow Forecasts - February 1, 1995

Forecast Pt Forecast Period	<-- Drier -- Future Conditions -- Wetter -->						30 Yr Avg (1000AF)	
	Chance of Exceeding *							
	90% (1000AF)	70% (1000AF)	50% (Most Prob) (1000AF)	30% (1000AF)	10% (1000AF)			
RED ROCK RIVER near Monida (2)								
APR-JUL	37	57	70	72	83	103	97	
APR-SEP	37	60	76	72	92	116	105	
BEAVERHEAD RIVER near Grant (2)								
APR-JUL	58	86	106	80	126	155	132	
APR-SEP	69	106	131	85	156	193	155	

JEFFERSON RIVER BASIN  
Streamflow Forecasts - February 1, 1995

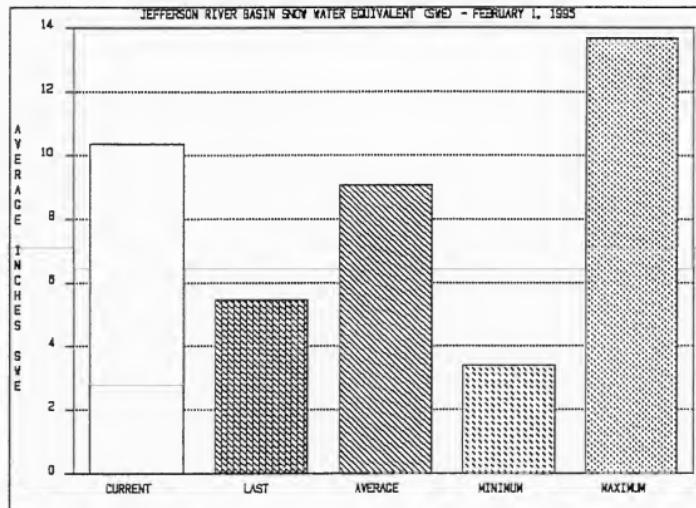
Forecast Pt Forecast Period	<--- Drier --- Future Conditions --- Wetter --->						30 Yr Avg (1000AF)	
	Chance of Exceeding *		50% (Most Prob)		30% 10%			
	90% (1000AF)	70% (1000AF)	(1000AF)	(% AVG.)	(1000AF)	(1000AF)		
<b>BEAVERHEAD RIVER at Barretts (2)</b>								
APR-JUL	87	118	139	81	160	191	172	
APR-SEP	115	149	172	85	195	230	203	
<b>RUBY RIVER near Alder</b>								
APR-JUL	68	86	98	118	110	128	83	
APR-SEP	84	105	119	120	133	154	99	
<b>BIG HOLE RIVER near Melrose</b>								
APR-JUL	465	600	690	108	780	915	641	
APR-SEP	525	665	760	109	855	995	697	
<b>BOULDER RIVER near Boulder</b>								
APR-JUL	43	65	80	94	95	117	85	
APR-SEP	43	66	81	89	96	119	91	
<b>WILLOW CREEK near Harrison</b>								
APR-JUL	5.8	12.9	17.7	100	23	30	17.7	
APR-SEP	6.1	14.4	20	100	26	34	20	
<b>JEFFERSON RIVER near Three Forks (2)</b>								
APR-JUL	710	910	1048	114	1180	1390	920	
APR-SEP	795	1010	1160	115	1310	1520	1012	

\* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
- (2) - The value is natural flow - actual flow may be affected by upstream water management.

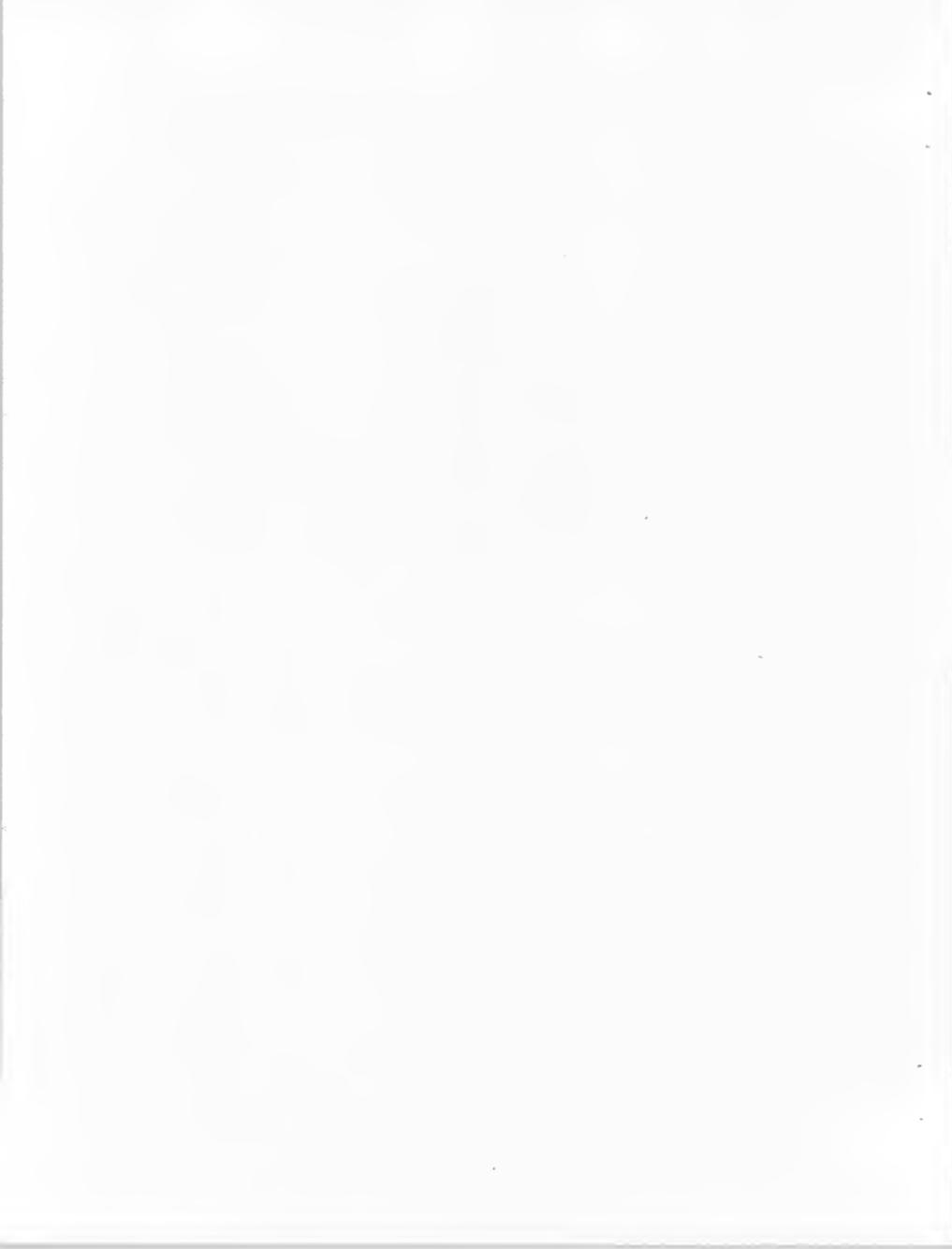
Surface Water Supply Indexes (SWSI's) were -0.6 in the Beaverhead River; 1.8 in the Ruby River; 0.6 in the Big Hole River; 0.5 in the Boulder River; and 0.5 for the Jefferson River as a whole.



AVERAGE IS FOR THE PERIOD 1961-1990.

MINIMUM SNOW WATER EQUIVALENT, 1961-1993, OCCURRED IN WATER YEAR 1977.

MAXIMUM SNOW WATER EQUIVALENT, 1961-1993, OCCURRED IN WATER YEAR 1965.



## MADISON RIVER BASIN as of February 1, 1995

Snowpack conditions in the Madison River Basin were well above average. Snow water content was 34 percent above average and 112 percent above last year.

## Watershed Snowpack Analysis

Watershed	Number of Data Sites	This Year	This Year as Percent of Last Year	This Year as Percent of Average
MADISON above HEBGEN LAKE	6	239		142
MADISON below HEBGEN LAKE	7	188		127
MADISON RIVER BASIN	13	211		134

Mountain precipitation during January was 28 percent above average and 89 percent above last year. Valley precipitation during January was 184 percent above average and 448 percent above last year. Water year precipitation for the basin, beginning October 1, 1994, was 29 percent above average and 92 percent above last year.

Reservoir storage on the last day of January was 4 percent above average and 1 percent above last year. Ennis Lake storage was 8 percent below average and 5 percent above last year and Hebgen Lake storage was 6 percent above average and 1 percent above last year.

## Reservoir Storage (1000AF) End of January

Reservoir	Usable Capacity	*****	Usable Storage This Year	*****	Usable Storage Last Year	*****	Usable Storage Average
ENNIS LAKE	41.0		31.2		29.8		34.0
HEBGEN LAKE	377.5		261.4		259.8		246.8

Streamflows, for the period April through July, are forecast to be 24 percent above average and 59 percent above last years forecasts.

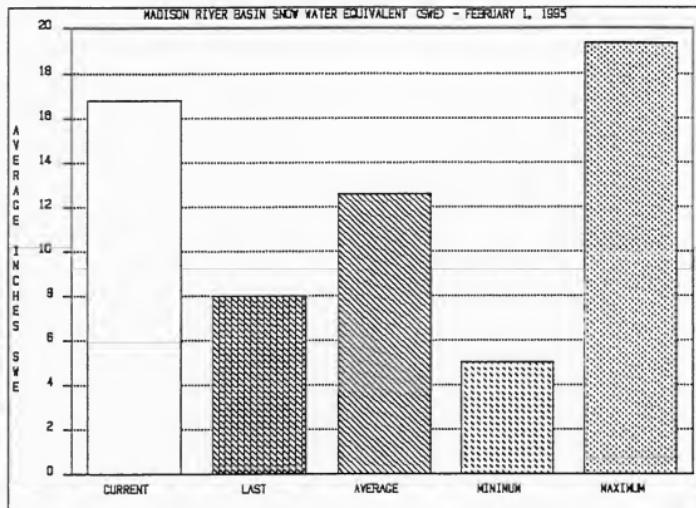
Streamflow Forecasts							
Forecast Pt Forecast Period	<--- Drier --- Future Conditions --- Wetter --->						
	Chance of Exceeding *						
	90% (1000AF)	70% (1000AF)	50% (Most Prob) (1000AF)	30% (% AVG.) (1000AF)	10% (1000AF)	30 Yr Avg (1000AF)	
MADISON RIVER near Grayling (2)							
APR-JUL	430	470	494	130	520	560	380
APR-SEP	545	590	624	128	655	705	486
MADISON RIVER near McAllister (2)							
APR-JUL	685	755	803	121	850	920	662
APR-SEP	875	955	1005	121	1060	1130	831

\* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
- (2) - The value is natural flow - actual flow may be affected by upstream water management.

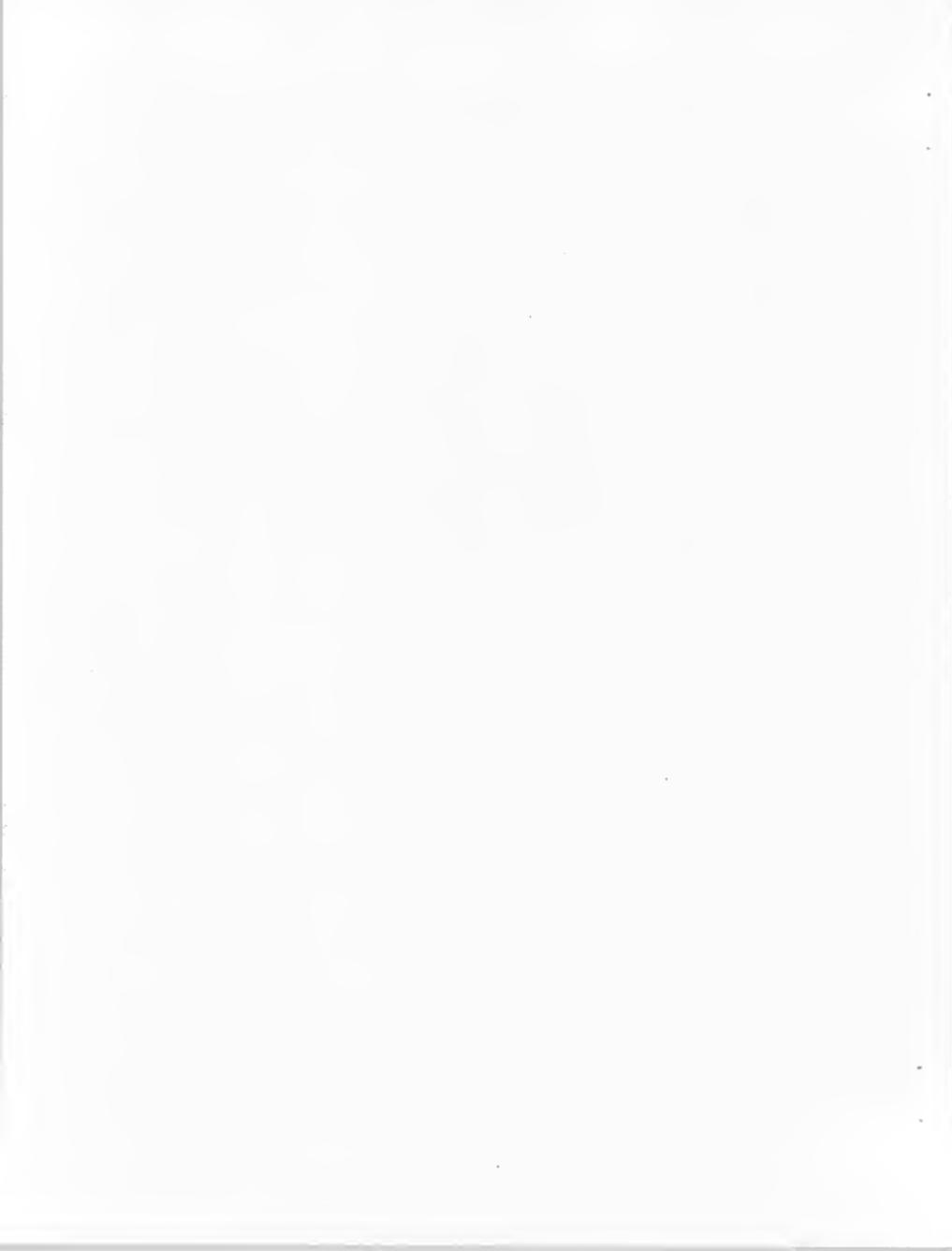
Surface Water Supply Index (SWSI) was 3.1 for the Madison River.



AVERAGE IS FOR THE PERIOD 1961-1990.

MINIMUM SNOW WATER EQUIVALENT, 1961-1993, OCCURRED IN WATER YEAR 1977.

MAXIMUM SNOW WATER EQUIVALENT, 1961-1993, OCCURRED IN WATER YEAR 1965.



## GALLATIN RIVER BASIN as of February 1, 1995

Snowpack conditions in the Gallatin River Basin were slightly above average. Snow water content was 9 percent above average and 43 percent above last year.

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 Watershed Snowpack Analysis
 

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Watershed	Number of Data Sites	This Year	as Percent of
		Last Year	Average
UPPER GALLATIN	4	183	124
HYALITE	3	122	94
BRIDGER	2	107	96
GALLATIN RIVER BASIN	9	143	109

---

Mountain precipitation during January was 2 percent above average and 29 percent above last year. Valley precipitation during January was 68 percent above average and 302 percent above last year. Water year precipitation for the basin, beginning October 1, 1994, was 14 percent above average and 56 percent above last year.

Middle Creek storage on the last day of January was 47 percent above average and 36 percent above last year.

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 Reservoir Storage (1000AF) End of January
 

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Reservoir	Usable Capacity	*****	Usable Storage	*****
		This Year	Last Year	Average
MIDDLE CREEK	10.2	5.3	3.9	3.6

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Streamflows, for the period April through July, are forecast to be 3 percent above average and 39 percent above last years forecasts.

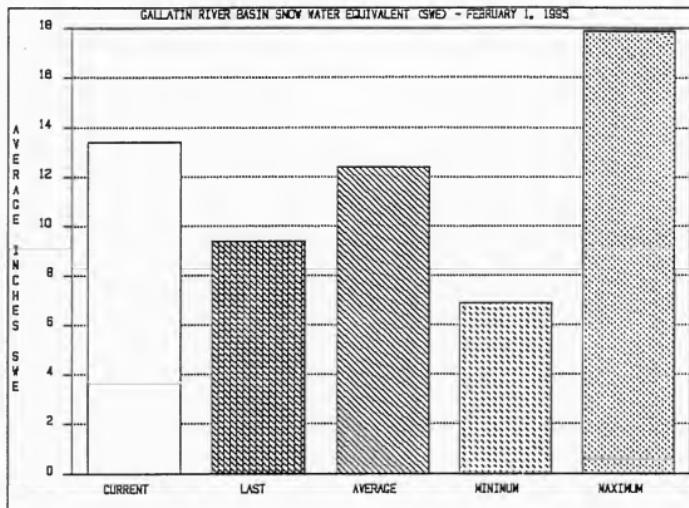
Streamflow Forecasts								
Forecast Pt Forecast Period	<-- Drier -- Future Conditions --- Wetter -->						30 Yr Avg (1000AF)	
	Chance of Exceeding *							
	90% (1000AF)	70% (1000AF)	50% (Most Prob) (1000AF)	30% (% AVG.)	10% (1000AF)	30 Yr Avg (1000AF)		
GALLATIN RIVER near Gateway								
APR-JUL	405	455	486	110	520	565	441	
APR-SEP	480	530	568	110	605	655	518	
E & W FK HYALITE CREEK near Bozeman								
APR-JUL	16.0	18.0	20	87	22	25	23	
APR-SEP	18.0	21	23	88	25	28	26	
HYALITE CREEK near Bozeman (2)								
APR-JUL	25	29	32	89	35	40	36	
APR-SEP	30	35	38	90	41	46	42	
GALLATIN RIVER at Logan (2)								
APR-JUL	350	435	494	99	550	635	498	
APR-SEP	430	520	578	99	640	725	581	

\* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
- (2) - The value is natural flow - actual flow may be affected by upstream water management.

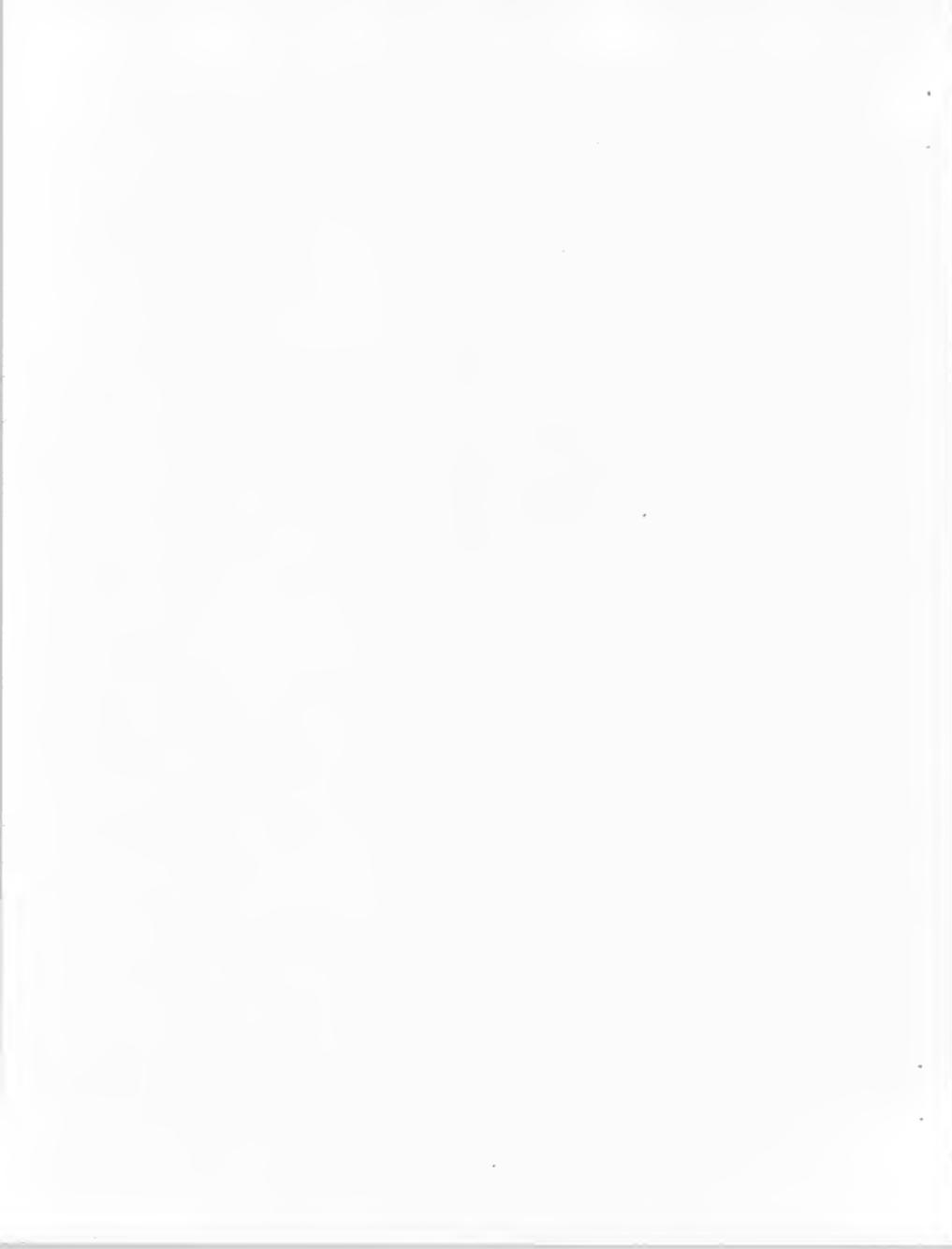
Surface Water Supply Index (SWSI) was 1.3 for the Gallatin River.



AVERAGE IS FOR THE PERIOD 1961-1990.

MINIMUM SNOW WATER EQUIVALENT, 1961-1993, OCCURRED IN WATER YEAR 1981.

MAXIMUM SNOW WATER EQUIVALENT, 1961-1993, OCCURRED IN WATER YEAR 1965.



Snowpack conditions for the Missouri Mainstem River Basin were below average. Snow water content was 13 percent below average and 2 percent below last year.

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#### Watershed Snowpack Analysis

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Watershed	Number of Data Sites	This Year as Percent of Last Year	This Year as Percent of Average
HEADWATERS MAINSTEM	8	134	99
SUN-TETON-MARIAS BASINS	9	100	85
SMITH-JUDITH-MUSSELSHELL	11	95	89
MAINSTEM ab FORT PECK RES	22	107	90
MILK	5	22	36
MISSOURI MAINSTEM BASIN	27	96	86

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Mountain precipitation during January was 37 percent below average and 8 percent below last year. Valley precipitation during January was 70 percent below average and 65 percent below last year. Water year precipitation for the basin, beginning October 1, 1994, was average and 19 percent above last year.

Reservoir storage on the last day of January was 5 percent below average and 6 percent below last year. Canyon Ferry Lake storage was 6 percent below average and 6 percent below last year; Helena Valley storage was 4 percent below average and the same as last year; Lake Helena storage was 4 percent above average and the same as last year; Hauser & Helena storage was 4 percent above average and the same as last year; Holter Lake storage was 11 percent above average and the same as last year; and Fort Peck Lake storage was 3 percent below average and 2 percent below last year.

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#### Reservoir Storage (1000AF) End of January

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Reservoir	Usable Capacity	*****	Usable Storage	*****	Average
		This Year	Last Year		
CANYON FERRY LAKE	2043.0	1500.0	1603.0	1596.0	
HELENA VALLEY	9.2	4.5	4.5	4.7	
LAKE HELENA	10.4	11.1	11.1	10.3	
HAUSER & HELENA	61.9	63.7	63.7	61.3	
HOLTER LAKE	81.9	81.1	81.2	72.9	
FORT PECK LAKE (MAF)	18.9	14.4	14.7	14.9	

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Streamflows, for the period April through July, are forecast to be 6 percent above average 61 percent above last years forecasts.

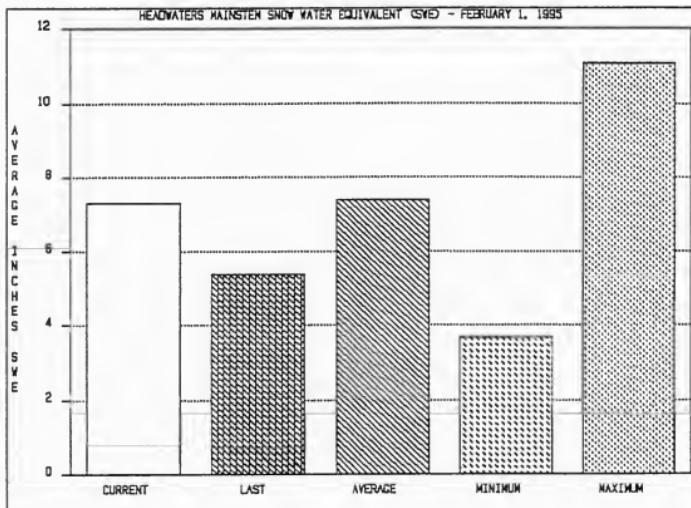
Streamflow Forecasts								
Forecast Pt Forecast Period	Future Conditions					Wetter		
	Chance of Exceeding *							
	90% (1000AF)	70% (1000AF)	50% (Most Prob) (1000AF)	30% (% AVG.)	10% (1000AF)	30 Yr Avg (10000AF)		
MISSOURI RIVER at Toston (2)								
APR-JUL	1560	2020	2340	113	2660	3120	2075	
APR-SEP	2030	2370	2700	112	3030	3380	2416	
PRICKLY PEAR CREEK near Clancy								
APR-JUL	6.0	15.0	22	96	29	38	23	
APR-SEP	9.0	20	27	100	34	45	27	
SUN RIVER at Gibson Dam (2)								
APR-JUL	275	355	410	86	465	545	478	
APR-SEP	315	400	455	87	510	595	526	
MISSOURI RIVER at Fort Benton (2)								
APR-JUL	2030	2810	3330	108	3850	4630	3087	
APR-SEP	2800	3450	4000	109	4550	5220	3678	
MARIAS RIVER near Shelby (2)								
APR-JUL	188	295	367	82	440	545	447	
APR-SEP	205	315	390	80	465	575	487	
MISSOURI RIVER at Virgelle (2)								
APR-JUL	2660	3340	3810	106	4280	4960	3595	
APR-SEP	2950	3950	4400	104	4850	6110	4217	
MISSOURI RIVER near Landusky (2)								
APR-JUL	3120	3700	4100	105	4500	5080	3897	
APR-SEP	3250	4530	4900	107	5270	6870	4580	
MISSOURI RIVER below Fort Peck (2)								
APR-JUL	2980	3670	4140	103	4610	5300	4015	
APR-SEP	3040	4350	4800	107	5250	6660	4467	
LAKE SAKAKAWEA Inflow (2)								
APR-JUL	6800	8650	9910	100	11200	13000	9897	
APR-SEP	8170	9970	11500	101	13000	15100	11346	

\* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
- (2) - The value is natural flow - actual flow may be affected by upstream water management.

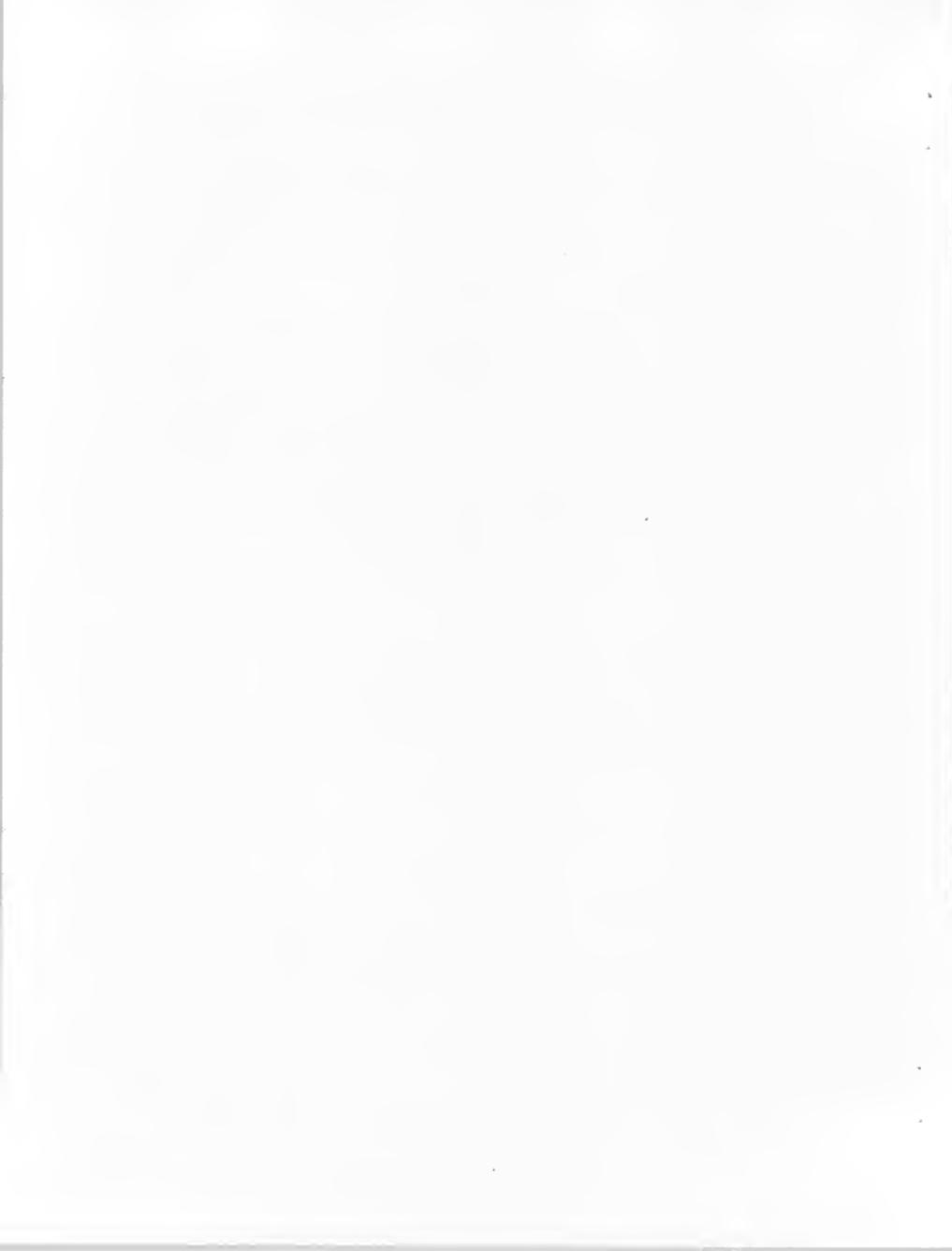
Surface Water Supply Indexes (SWSI's) were 1.6 in the Missouri River above Canyon Ferry; 1.1 in the Missouri River below Canyon Ferry; 0.6 in the Missouri River above Fort Peck; and 0.1, in the Missouri River below Fort Peck.



AVERAGE IS FOR THE PERIOD 1961-1990.

MINIMUM SNOW WATER EQUIVALENT, 1961-1993, OCCURRED IN WATER YEAR 1961.

MAXIMUM SNOW WATER EQUIVALENT, 1961-1993, OCCURRED IN WATER YEAR 1972.



## SMITH-JUDITH-MUSSELSHELL RIVER BASINS as of February 1, 1995

Snowpack conditions in the Smith-Judith-Musselshell River Basins were slightly below average. Snow water content in the Smith River Basin was 7 percent below average and 4 percent below last year; in the Judith River Basin was 15 percent below average and 19 percent below last year; and in the Musselshell River Basin was 14 percent below average and 43 percent above last year.

## Watershed Snowpack Analysis

Watershed	Number of Data Sites	This Year as Percent of Last Year	This Year as Percent of Average
SMITH	4	96	93
JUDITH	4	81	85
MUSSELSHELL	3	143	86
SMITH-JUDITH-MUSSELSHELL	8	97	91

Mountain and valley precipitation in the Smith River Basin during January was 25 percent below average and 17 percent below last year; in the Judith River Basin during January was 32 percent below average and 47 percent below last year; and in the Musselshell River Basin during January was 13 percent above average and 33 percent above last year. Water year precipitation, beginning October 1, 1994, in the Smith-Judith-Musselshell River Basins was average and 1 percent above last year.

Reservoir storage on the last day of January was 2 percent above average and 26 percent below last year. Smith River storage was 25 percent below average and 46 percent below last year; Newlan Creek storage was 16 percent above average and 9 percent below last year; Bair storage was 21 percent below average and 39 percent below last year; Martinsdale storage was 54 percent below average and 75 percent below last year; and Deadman's Basin was 17 percent above average and 11 percent below last year.

## Reservoir Storage (1000AF) End of January

Reservoir	Usable Capacity	***** This Year	***** Last Year	***** Average
SMITH RIVER	10.6	4.7	8.7	6.3
NEWLAN CREEK	12.4	10.2	11.2	8.8
BAIR	7.0	3.0	4.9	3.8
MARTINSDALE	23.1	4.2	16.7	9.2
DEADMAN'S BASIN	72.2	50.4	56.4	43.0

Streamflows, for the period April through July, are forecast to be 13 percent below average and 1 percent below last years forecasts.

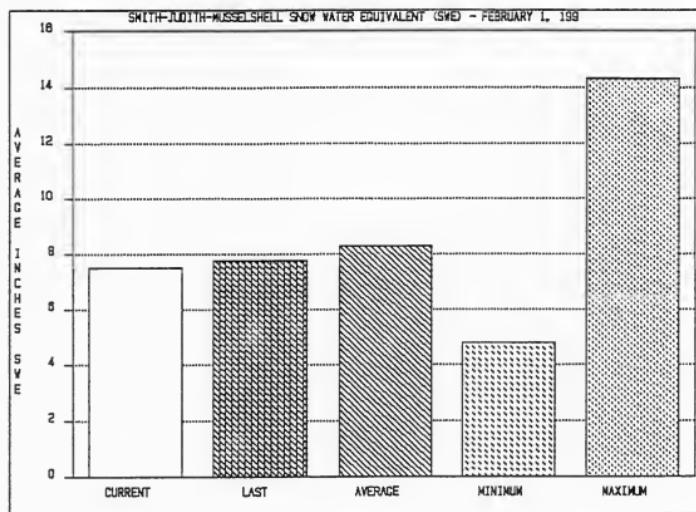
Streamflow Forecasts								
Forecast Pt Forecast Period	Future Conditions						30 Yr Avg (1000AF)	
	Chance of Exceeding *							
	90% (1000AF)	70% (1000AF)	50% (Most Prob) (1000AF)	30% (1000AF)	10% (1000AF)			
SMITH RIVER near Fort Logan								
APR-JUL	29	44	54	87	64	79	62	
APR-SEP	39	55	66	90	77	93	73	
SHEEP CREEK nr White Sulphur Springs								
APR-JUL	10.1	12.9	14.7	81	16.5	19.3	18.1	
APR-SEP	12.0	15.0	17.0	82	19.0	22	21	
NF MUSSELSHELL near Delpine								
APR-JUL	1.4	2.8	3.7	77	4.6	6.0	4.8	
APR-SEP	1.8	3.3	4.4	79	5.5	7.0	5.6	
SF MUSSELSHELL abv Martinsdale								
APR-JUL	13.0	33	47	90	61	81	52	
APR-SEP	16.0	37	51	91	65	86	56	

\* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
- (2) - The value is natural flow - actual flow may be affected by upstream water management.

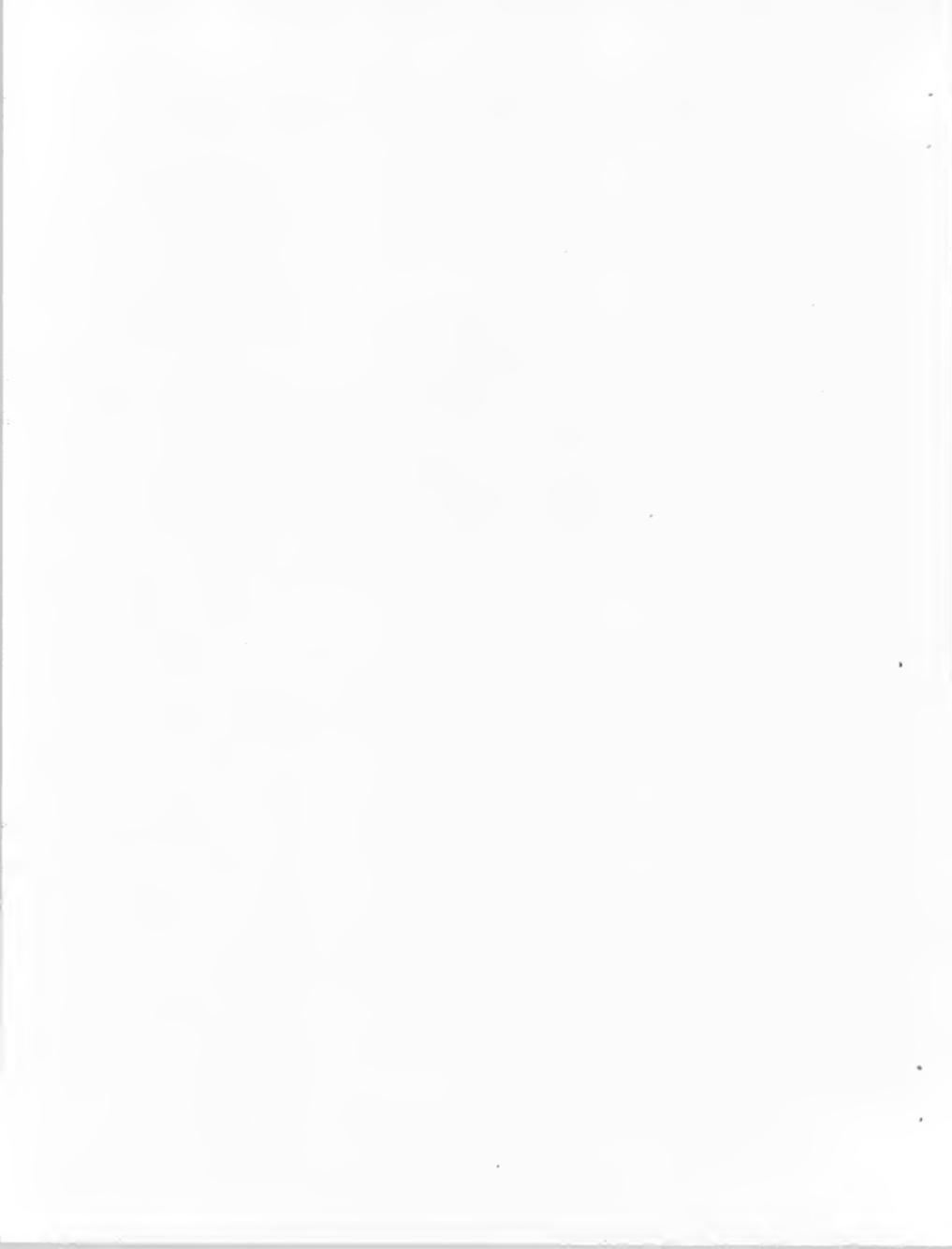
Surface Water Supply Index (SWSI) was -1.0 in the Smith River and -0.5 in the Musselshell River.



AVERAGE IS FOR THE PERIOD 1961-1990.

MINIMUM SNOW WATER EQUIVALENT, 1961-1993, OCCURRED IN WATER YEAR 1987.

MAXIMUM SNOW WATER EQUIVALENT, 1961-1993, OCCURRED IN WATER YEAR 1978.



## SUN-TETON-MARIAS RIVER BASINS as of February 1, 1995

Snowpack conditions in the Sun-Teton-Marias River Basin are slightly below average. Snow water content in the Sun River Basin was 22 percent below average and 2 percent above last year; the Teton River Basin was 22 percent below average and 18 percent below last year; and the Marias River Basin was 4 percent below average and 14 percent above last year.

## Watershed Snowpack Analysis

Watershed	Number of Data Sites	This Year as Percent of Last Year	This Year as Percent of Average
SUN	2	102	78
TETON	3	82	78
MARIAS	4	109	92
SUN-TETON-MARIAS BASINS	4	103	88

Mountain and valley precipitation during January in the Sun River Basin was 76 percent below average and 58 percent below last year; in the Teton River Basin was 66 percent below average and 61 percent below last year; and in the Marias River Basin was 58 percent below average and 42 percent below last year. Water year precipitation for the Sun-Teton-Marias river basins, beginning October 1, 1994, was 3 percent above average and 33 percent above last year.

Reservoir storage on the last day of January was 10 percent above average and 14 percent below last year. Gibson storage was 59 percent below average and 62 percent below last year; Fishkun storage was 0 percent of average and 0 percent of last year; Willow Creek storage was 12 percent below average and 39 percent below last year; Lower Two Medicine Lake storage was 54 percent above average and 13 percent below last year; Four Horns Lake storage was 9 percent below average and 13 percent below last year; Swift storage was 14 percent below average and 37 percent below last year; Lake Frances storage was 30 percent below average and 48 percent below last year; and Lake Elwell (Tiber) storage was 25 percent above average and 3 percent below last year.

## Reservoir Storage (1000AF) End of January

Reservoir	Usable Capacity	*****	Usable Storage This Year	*****	Usable Storage Last Year	*****	Average
GIBSON	99.1		18.2		48.4		44.2
PISHKUN	32.0		0.0		19.7		17.7
WILLOW CREEK	32.2		18.6		30.6		21.2
LOWER TWO MEDICINE LAKE	11.9		10.3		11.8		6.7
FOUR HORNS LAKE	19.2		11.3		13.0		12.4
SWIFT	30.0		13.2		20.9		15.3
LAKE FRANCES	112.0		49.0		94.0		69.6
LAKE ELWELL (TIBER)	1347.0		727.2		746.1		583.0

Streamflows, for the period April through July, are forecast to be 15 percent below average and 13 percent above last years forecasts.

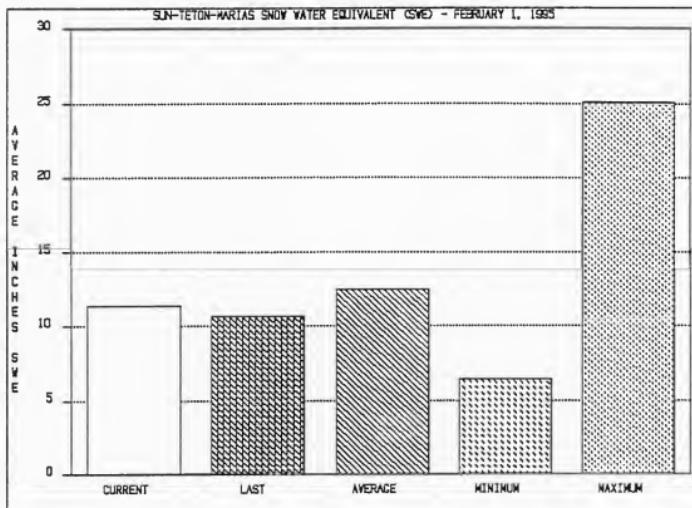
Streamflow Forecasts								
Forecast Pt Forecast Period	<-- Drier -->		Future Conditions			-- Wetter -->		30 Yr Avg (1000AF)
	Chance of Exceeding *		50% (Most Prob)		30%	10%		
	90%	70%	(1000AF)	(1000AF)	(% AVG.)	(1000AF)	(1000AF)	
SUN RIVER at Gibson Dam (2)								
APR-JUL	275	355	410	86	465	545	478	
APR-SEP	315	400	455	87	510	595	526	
TWO MEDICINE RIVER near Browning (2)								
APR-JUL	113	162	195	91	230	275	215	
APR-SEP	125	174	207	91	240	290	228	
BADGER CREEK near Browning (2)								
APR-JUL	58	80	94	90	108	130	104	
APR-SEP	71	94	109	91	125	147	120	
SWIFT RESERVOIR Inflow near Dupuyer								
APR-JUL	35	51	61	90	72	87	68	
APR-SEP	44	61	72	90	83	100	80	
DUPUYER CREEK near Valier								
APR-JUL	2.0	4.6	7.3	47	13.5	23	15.5	
APR-SEP	2.4	5.4	8.4	48	14.9	25	17.4	
CUT BANK CREEK at Cut Bank								
APR-JUL	47	62	72	83	82	98	87	
APR-SEP	56	70	80	83	90	105	96	
MARIAS RIVER near Shelby (2)								
APR-JUL	188	295	367	82	440	545	447	
APR-SEP	205	315	390	80	465	575	487	

\* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

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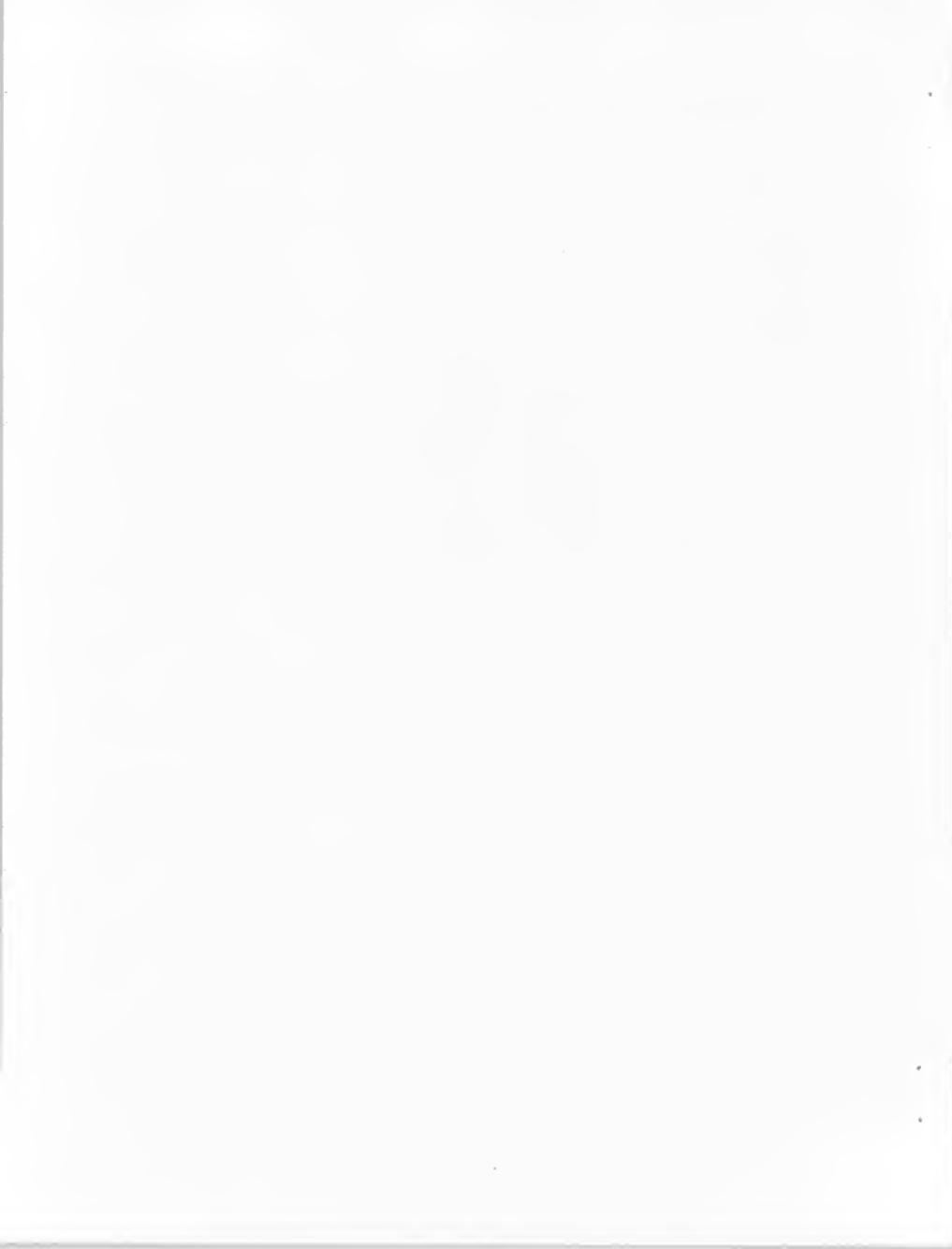
Surface Water Supply Indexes (SWSI's) were -2.3 in the Sun River; -2.2 in the Teton River; -1.6 in the Birch/Dupuyer Creeks; and -0.2 in the Marias River.



AVERAGE IS FOR THE PERIOD 1961-1990.

MINIMUM SNOW WATER EQUIVALENT, 1961-1993, OCCURRED IN WATER YEAR 1977.

MAXIMUM SNOW WATER EQUIVALENT, 1961-1993, OCCURRED IN WATER YEAR 1972.



Snowpack conditions in the St. Mary and Milk River Basins were below average. Snow water content in the St. Mary River Basin was 7 percent below average and 14 percent above last year and in the Milk River Basin was 64 percent below average and 78 percent below last year.

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 Watershed Snowpack Analysis
 

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Watershed	Number of Data Sites	This Year as Percent of Last Year	This Year as Percent of Average
ST. MARY RIVER BASIN	2	114	93
BEARPAW MOUNTAINS	5	22	36
CYPRESS HILLS, CANADA	0	0	0
MILK RIVER BASIN	5	22	36
ST. MARY and MILK BASINS	7	78	80

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Mountain and valley precipitation in the St. Mary River Basin during January was 37 percent below average and 28 percent below last year and in the Milk River Basin was 71 percent below average and 83 percent below last year. Water year precipitation for the St. Mary and Milk River Basins, beginning October 1, 1994, was 1 percent below average and 16 percent above last year.

Reservoir storage on the last day of January was 22 percent below average and 51 percent below last year. Lake Sherburne storage was 35 percent below average and 53 percent below last year; Fresno storage was 3 percent below average and 36 percent below last year; Beaver Creek storage was 44 percent above average and 7 percent below last year; and Nelson storage was 43 percent below average and 68 percent below last year.

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 Reservoir Storage (1000AF) End of January
 

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Reservoir	Usable Capacity	*****	Usable Storage This Year	*****	Storage Last Year	*****	Average
LAKE SHERBURNE	64.3		15.5		32.7		24.0
FRESNO	127.0		49.8		77.8		51.2
BEAVER CREEK	3.5		2.6		2.8		1.8
NELSON	66.8		20.7		65.7		36.4

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Streamflows, for the period April through July, are forecast to be 19 percent below average and 8 percent above last years forecasts.

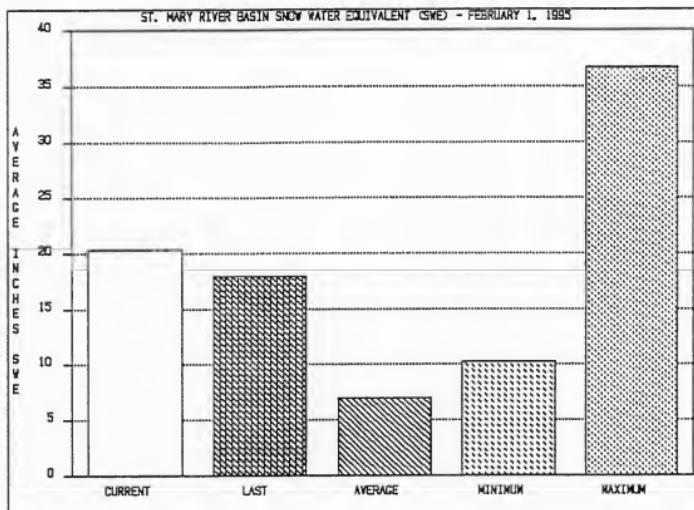
Streamflow Forecasts								
Forecast Pt Forecast Period	<--- Drier --- Future Conditions --- Wetter --->						30 Yr Avg (1000AF)	
	Chance of Exceeding *							
	90% (1000AF)	70% (1000AF)	50% (Most Prob) (1000AF)	30% (1000AF)	10% (1000AF)			
SWIFTCURRENT CREEK at Sherburne (2)								
APR-JUL	77	87	93	87	100	109	107	
APR-SEP	93	102	108	86	114	123	125	
ST. MARY RIVER near Babb								
APR-JUL	275	305	329	83	350	385	395	
APR-SEP	325	365	387	84	410	445	463	
MILK RIVER at Western Crossing								
MAR-JUL	7.0	18.0	25	57	32	43	44	
MAR-SEP	10.0	20	27	59	34	45	46	
MILK RIVER at Eastern Crossing (2)								
MAR-JUL	16.0	42	60	75	78	104	80	
MAR-SEP	23	49	67	76	85	111	88	
BEAVER CREEK near Havre								
MAR-JUL	2.0	4.8	7.7	75	11.4	16.8	10.3	

\* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
- (2) - The value is natural flow - actual flow may be affected by upstream water management.

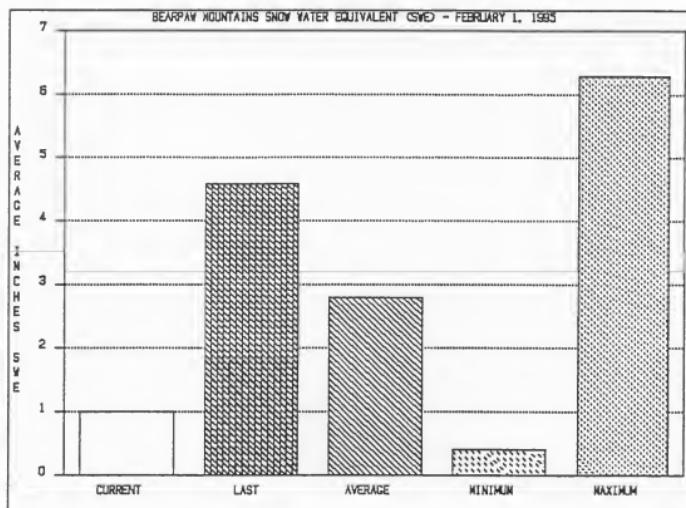
Surface Water Supply Index (SWSI) was -1.9 in the Milk River.



AVERAGE IS FOR THE PERIOD 1961-1990.

MINIMUM SNOW WATER EQUIVALENT, 1961-1993, OCCURRED IN WATER YEAR 1977.

MAXIMUM SNOW WATER EQUIVALENT, 1961-1993, OCCURRED IN WATER YEAR 1972.



AVERAGE IS FOR THE PERIOD 1961-1990.

MINIMUM SNOW WATER EQUIVALENT, 1973-1993, WAS 0.4 INCHES AND OCCURRED IN WATER YEAR 1973.

MAXIMUM SNOW WATER EQUIVALENT, 1973-1993, WAS 6.3 INCHES AND OCCURRED IN WATER YEAR 1978.

## UPPER YELLOWSTONE RIVER BASIN as of February 1, 1995

Snowpack conditions in the Upper Yellowstone River Basin were slightly above average. Snow water content was 5 percent above average and 37 percent above last year.

## Watershed Snowpack Analysis

Watershed	Number of Data Sites	This Year	as Percent of Last Year	Average
YELLOWSTONE ab LIVINGSTON	14	158		108
SHIELDS	4	119		99
BOULDER-STILLWATER	3	102		91
CLARK'S FORK-ROCK CREEK	9	132		105
UPPER YELLOWSTONE BASIN	26	137		105

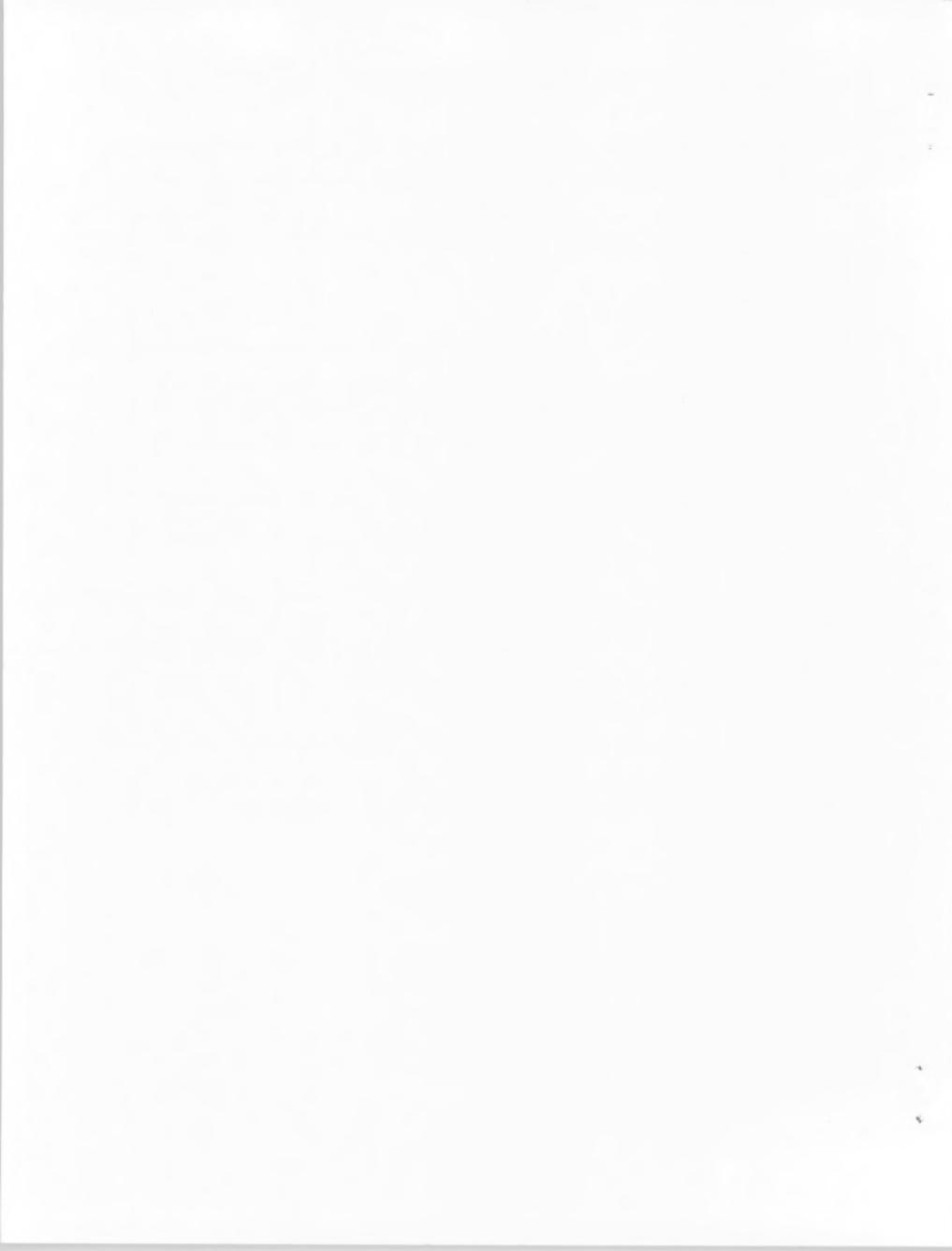
Mountain precipitation during January was 12 percent below average and 8 percent below last year. Valley precipitation during January was 9 percent above average and 159 percent above last year. Water year precipitation for the basin, beginning October 1, 1994, was 15 percent above average and 49 percent above last year.

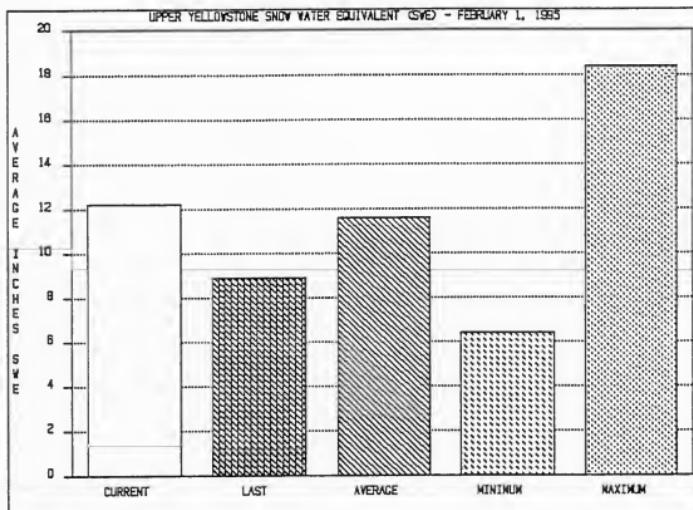
Reservoir storage on the last day of January was 8 percent above average and 8 percent above last year. Mystic Lake storage was 33 percent below average and 19 percent above last year and Cooney storage was 32 percent above average and 5 percent above last year.

## Reservoir Storage (1000AF) End of January

Reservoir	Usable Capacity	*****	Usable Storage	*****	Average
MYSTIC LAKE	21.0	5.7	4.8	8.5	
COONEY	27.4	19.3	18.4	14.6	

Streamflows, for the period April through July, are forecast to be 2 percent above average and 33 percent above last years forecasts.

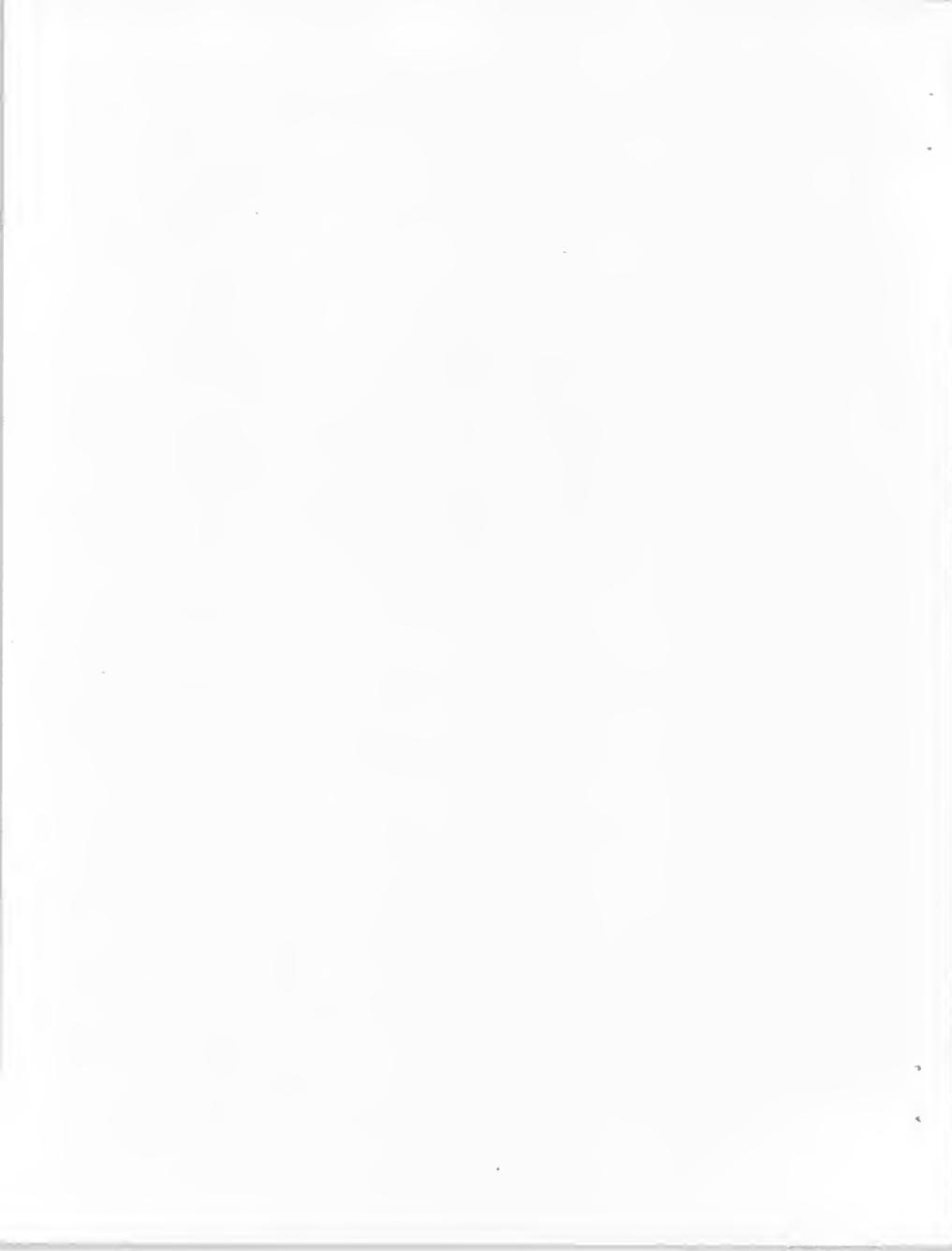




AVERAGE IS FOR THE PERIOD 1961-1990.

MINIMUM SNOW WATER EQUIVALENT, 1961-1993, OCCURRED IN WATER YEAR 1977.

MAXIMUM SNOW WATER EQUIVALENT, 1961-1993, OCCURRED IN WATER YEAR 1965.



## LOWER YELLOWSTONE RIVER BASIN as of February 1, 1995

Wyoming snowpack conditions for the Lower Yellowstone River Basin were near average. Snow water content was 2 percent above average and 28 percent above last year.

## Watershed Snowpack Analysis

Watershed	Number of Data Sites	This Year	This Year as Percent of Last Year	This Year as Percent of Average
WIND RIVER (Wyoming)	19	161		96
SHOSHONE RIVER (Wyoming)	7	158		115
BIGHORN RIVER (Wyoming)	21	119		104
LITTLE BIGHORN (WYOMING)	3	71		82
TONGUE RIVER (Wyoming)	9	98		98
POWDER RIVER (Wyoming)	9	133		118
LOWER YELLOWSTONE BASIN	48	128		102

Mountain and valley precipitation during January was 7 percent below average and 15 percent below last year. Water year precipitation for the basin, beginning October 1, 1994, was 30 percent above average and 46 percent above last year.

Reservoir storage on the last day of January was 6 percent below average and 3 percent below last year. Bighorn Lake storage was 6 percent below average and 3 percent below last year and Tongue River storage was 29 percent below average and 1 percent above last year.

## Reservoir Storage (1000AF) End of January

Reservoir	Usable Capacity	*****	Usable Storage	*****	Average
BIGHORN LAKE	1356.0		792.8		817.3
TONGUE RIVER	68.0		19.3		19.1

Streamflows, for the period April through July, are forecast to be 1 percent below average and 30 percent above last years forecasts.

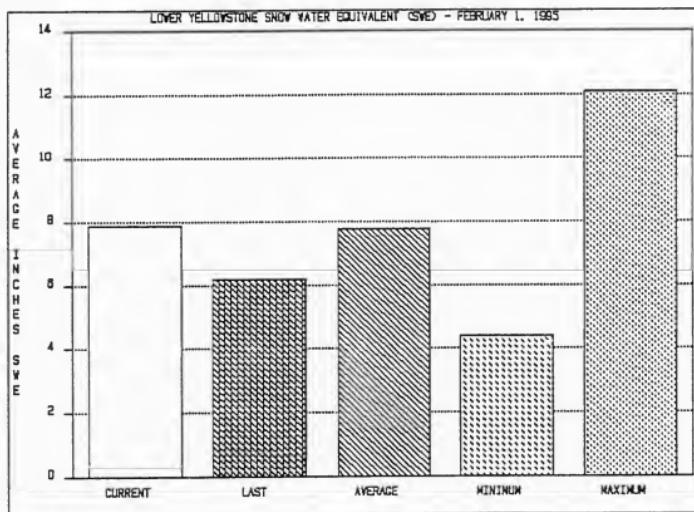
Streamflow Forecasts									
Forecast Pt Forecast Period	<-- Drier -- Future Conditions -- Wetter -->							30 Yr Avg (1000AF)	
	Chance of Exceeding *								
	90% (1000AF)	70% (1000AF)	50% (Most Prob) (1000AF)	30% (1000AF)	10% (1000AF)				
YELLOWSTONE RIVER at Billings (2)									
APR-JUL	2850	3330	3665	102	4000	4480	3577		
APR-SEP	3560	4080	4440	105	4800	5320	4211		
BIGHORN RIVER nr St. Xavier (2)									
APR-JUL	1180	1550	1800	109	2050	2420	1645		
APR-SEP	1420	1730	2000	111	2270	2440	1794		
LITTLE BIGHORN RIVER nr Hardin									
APR-JUL	64	106	135	96	164	205	140		
APR-SEP	76	123	155	99	187	235	157		
TONGUE RIVER stateline nr Decker (2)									
APR-JUL	139	192	228	99	265	315	230		
APR-SEP	118	215	250	98	285	355	256		
YELLOWSTONE RIVER at Miles City (2)									
APR-JUL	3940	4930	5600	103	6270	7260	5431		
APR-SEP	5150	5840	6600	105	7360	7910	6281		
POWDER RIVER at Moorhead									
MAR-JUL	149	192	221	90	250	295	246		
MAR-SEP	176	220	246	92	275	315	268		
POWDER RIVER near Locate									
MAR-JUL	151	210	247	77	285	345	320		
MAR-SEP	155	225	274	80	320	395	343		
YELLOWSTONE RIVER nr Sidney (2)									
APR-JUL	3770	4850	5580	94	6310	7390	5925		
APR-SEP	5040	5650	6500	95	7350	8310	6814		

\* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
- (2) - The value is natural flow - actual flow may be affected by upstream water management.

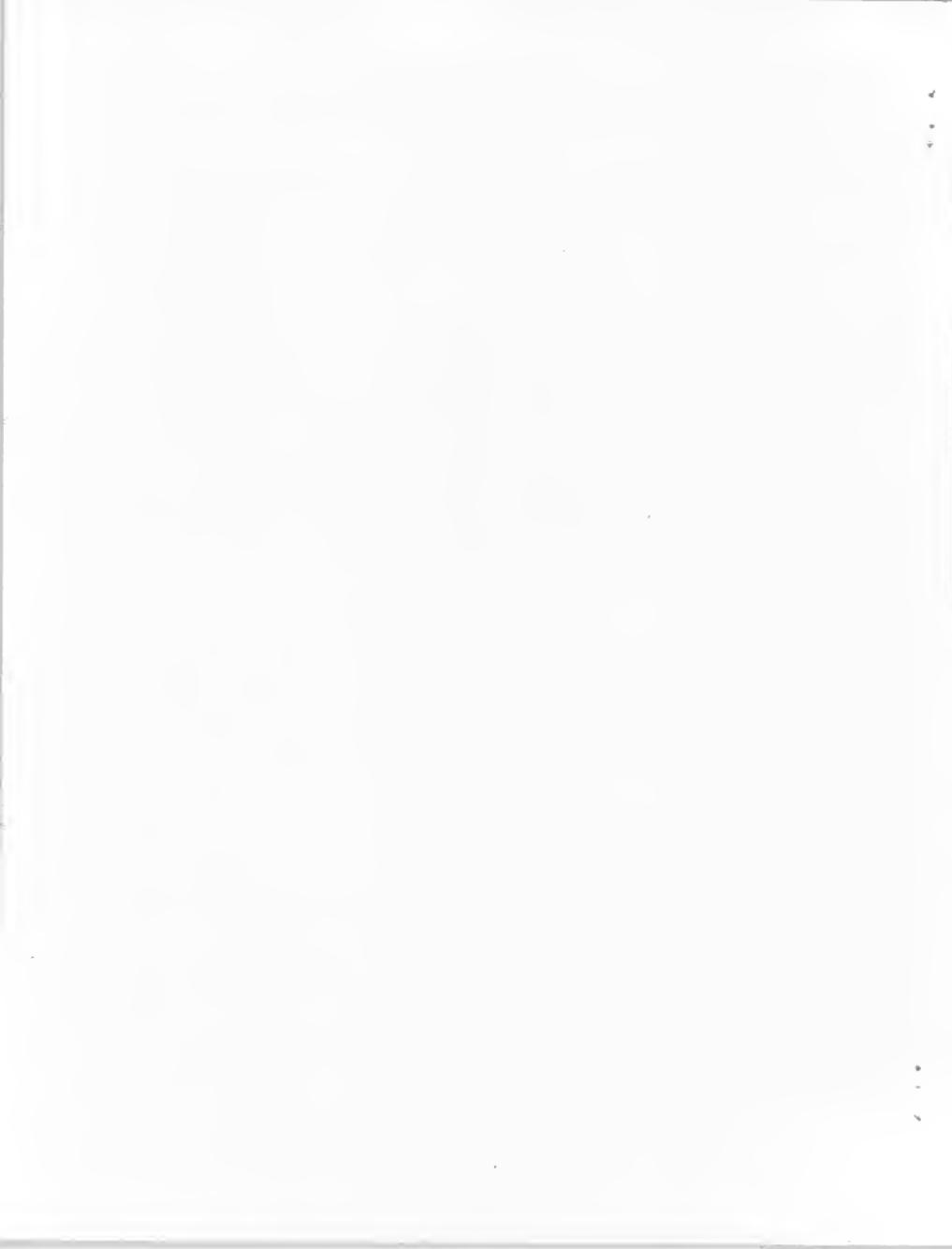
Surface Water Supply Indexes (SWSI's) were -0.4 in the Bighorn River below Bighorn Lake; -1.4 in the Little Bighorn River; 0.5 in the Yellowstone River below Bighorn River; -0.4 in the Tongue River; and 1.9 in the Powder River.

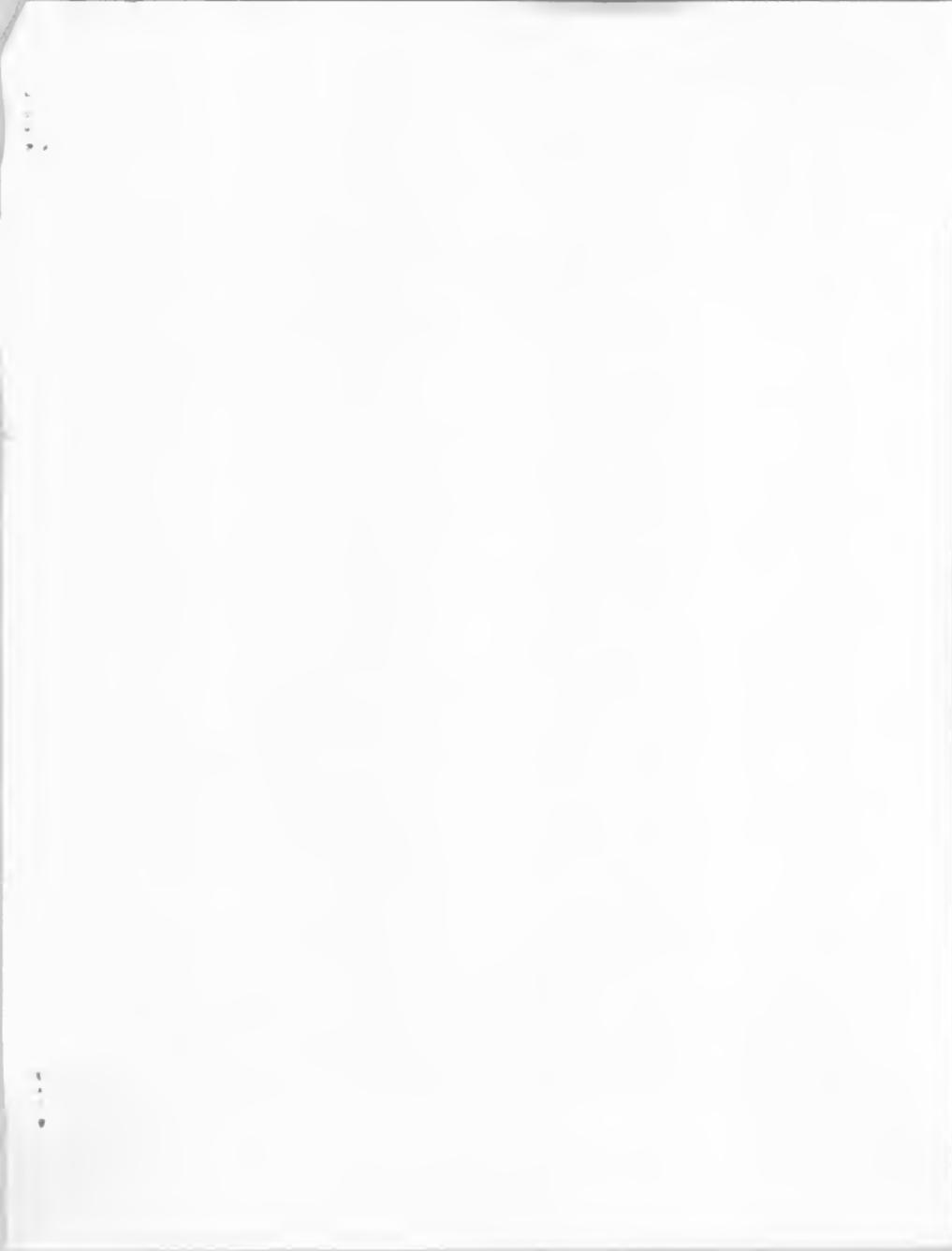


AVERAGE IS FOR THE PERIOD 1961-1990.

MINIMUM SNOW WATER EQUIVALENT, 1961-1993, OCCURRED IN WATER YEAR 1977.

MAXIMUM SNOW WATER EQUIVALENT, 1961-1993, OCCURRED IN WATER YEAR 1983.







Federal Building, Room 443  
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Bozeman, MT 59715

**Montana  
Basin Outlook Report**  
Natural Resources Conservation Service  
Bozeman, MT

